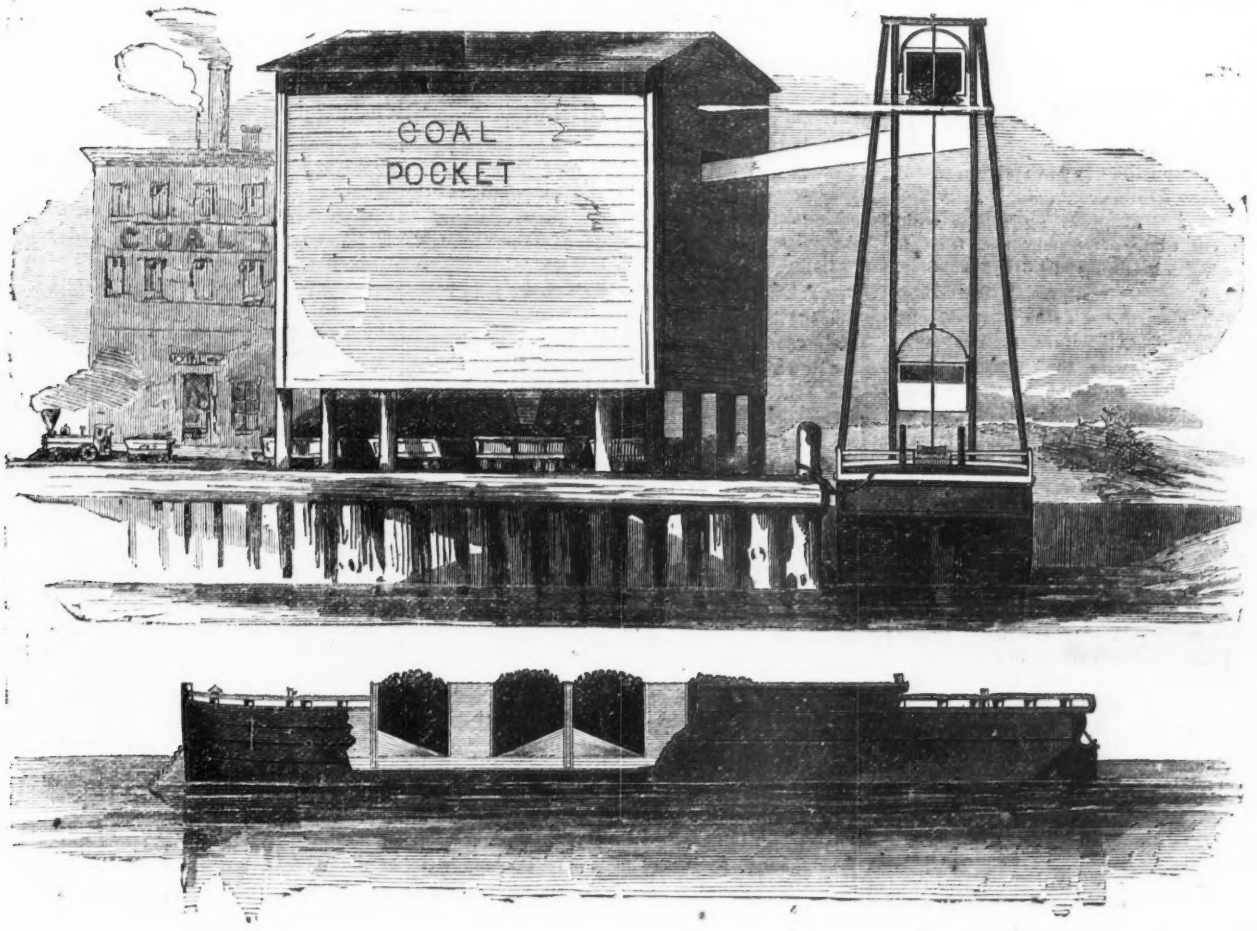
THE ENGINEERING AND MINING JOURNAL.

VOL. XIII.—No. 25.—FOURTH SERIES.] NEW YORK, TUESDAY, JUNE 18, 1872. PRICE 10 CENTS PER COPY.

Improved Coal Barges.

We give herewith two illustrations, showing the improved form of coal barges, as built by the American Coal Barge Company. They are 175 feet long, and will carry 1,000 tons each, whereas the old barges only carry 200. This increased capacity is made possible by the ingenious arrangement of the cargo, which permits very rapid loading and discharging.



IMPROVED COAL BARGES.

The barges are divided into pockets or compartments, to each pair of which there is a well-hole, over which an elevator may be placed. The buckets of the elevator descend to the bottom of the well-hole, and are loaded through a gate by the automatic descent of the coal. As the poet remarks :—

From the pocket,
To the bucket,
Needn't knock it—
Sort o' suck it!

The coal is discharged by this system at the rate of 200 to 250 tons per hour, or ten times as fast as formerly, and without the aid of shovels or derricks. As this principle is familiar to mining engineers, though its present application is new, we presume the accompaning cuts will need no further explanation.

Engineering and Mechanical Notes.

The London Mining Journal describes a new coal-cutting machine, patented by Messrs. Gillot & Copley. It consists of two seven-inch cylinders, with 12-inch stroke, driving by bevel gearing a horizontal wheel, with cutters fixed in the periphery. It is mounted on four wheels, and traverses along the face of the coal by means of a wire rope three-eighths of an inch in thickness. Compressed air is the motive power. The machine was set to work in what is known as the Dunston Seam, which is about three feet thick. The whole length of 70 yards was completed, including stoppages, in 77 minutes. The average depth holed was about 3 ft. 4 in., the groove made in cutting being about 8 in. The pressure of the air was 21 lbs. Since the trial the same length is said to have been accomplished in 60 minutes. The machine is well adapted for working in seams of almost any thickness, being 5 feet in length, 2 feet 4 in. wide, and 2 feet 4 in. in height.

The system of hot water foot warmers, by which railway cars are warmed (not *heated*) in Germany, has been modified by a Mr. Keinast, who fills the cases with an artificial fuel, which consists of pulverized charcoal, nitric acid, and starch. At first the iron cases were perforated in the sides and placed in th coupè. This was found, however, to be productive of headaches, and the fuel was, therefore, put into closed cases, which were pushed from the out side under the seats. The fuel, as used, was made up in half-pound pieces. In an experiment on the line between Aix and Berlin, eight pieces were used, in four cases, for the heating of one compartment. After a sixteen hours' journey, the pieces of charcoal were still glowing, and a thorough heating of the compartment had taken place. The cost of a hundred-weight of the fuel is 10 thalers ($7.50), and the heating on the above journey cost about ten and a half groschen, or about 26 cents.

Mr. PLIMSOLL, an Englishman, wh has invented

a miners safety lamp, proposes to make explosions absolutely impossible, by connecting the air chamber of the lamp, with a reservoir of pure air, in a bag or other vessel, so that the lamp is fed from this reservoir entirely, and when the reservoir becomes exhausted, the light must go out for a supply of oxygen, while, if there should be a down draught from the orifice, at which the results of combustion escape, the lamp would at once be extinguished by the flame being forced into the narrow passage or passages of the air chamber, in which it is necessarily immediately choked out. Thus, Mr. PLIMSOLL claims that this lamp may be safely used in workings in which no one could breathe without wearing a diver's helmet, supplied with air from a similar reservoir to that which feeds the lamp, or by means of pipes and a force pump in the usual way. This would probably be effective, but precautions, like these, are hardly applicable, without incessant watchfulness and great expense.

Lest some of our readers should attempt to improve the efficiency of their lightning rods by connecting them with the gas and water mains in the streets, we will quote three cases cited by Prof. John Wise. In one the electric fluid ran 1,000 feet along the gas main, breaking the joints here and there. In both the others the distance travelled along the main was 400 feet, and the lead was melted out of all the joints.

Two of the questions which excited most interest at the late meeting of the mining engineers, were the condition of sulphur in coal, and the possibility of coking western lignites. Recent investigations upon the products of coal distillation have shown that it is possible to produce resins containing a large proportion of sulphur. Thianiline, an aniline resin contains 20·9 per cent. of sulphur and from it another resinoid, containing 34·6 of sulphur, can be separated. The fossil resin, Tasmanite, also contains this element. These observations, says the *Gas Light Journal*, "are at least suggestive, in connection, with the growing conviction among analysts of carbo-hydrogen minerals, that the sulphur in coals, which imparts itself to the gas, at least partly, in forms not yet fully understood, is often contained therein in some kind of organic combination." As to the western lignites it is reported that Mr. Stowe, a San Franciscan, who has a lease of the Hinton mine at Evanstown, a few weeks ago employed some cokers, and essayed the experiment of converting coal to coke upon a large scale, with almost perfect success. The Evanston coal is in some respects not a sample of the Rocky Mountain lignites. It is denser and closer in the texture, and requires different treatment from the others under a boiler. It needs a strong blast and then makes a hot fire excellent for making steam. The Engineers on the Union Pacific Railroad look upon it with favor.

The coking of this coal, if it really is an accomplished fact, is important, but it will not, as some suppose, reduce the cost of smelting one-half. It will reduce it somewhat, probably, but its real importance lies in the fact that the day is probably not far off when Utah and the other Territories will have no other fuel than these fossil deposits, and *must* use them. Their present use, too, would save a vast deal of timber needed in the mines and for other purposes. No information has reached us of what measures were taken to coke it, but we think that apparatus so perfect as the Belgian coke oven would have an excellent chance of success. The superiority of these ovens is so great and their cost so moderate that it is surprising they are not oftener built in this country. The analysis of the Evanston coal will be found in Mr. EILERS' paper on the Metallurgical value of the Western Lignites which we published last week.

A propos of the Channel Ferry, of which we spoke in a former number, it may be amusing, at least, to enumerate some of the projects on hand for this work. 1. Railway with draws for the passage of vessels. 2. Submarine railway. 3. Larger vessels without crossing trains. 4. Railway ferry. 5. Tunnel through the clay avoiding the chalk formation with its fissures. 6. Vessels to draw but little water, of dimensions, 500 feet long by 90 feet amidships, and 800 tons burthen, builder's measurement. This boat would be constructed to receive trains on rails in the centre, while on each side are to be handsome saloons, refreshment and promenade accommodation for 1,000 persons.

Iron Making in Rhode Island.

BY PROFESSOR R. H. THURSTON.

There exist in the neighborhood of Providence, Rhode Island, two deposits of iron ore which were once quite extensively worked, when charcoal could be obtained to supply the furnaces, but which were abandoned before the discovery of the value of native fossil fuel in iron making, in consequence of the destruction of the adjacent forests.

The working of these ores began as early as 1703 and continued up to about the year 1834, and the iron produced, I am told by old manufacturers who have used it, was of an excellent quality.

One of these deposits is that at Cumberland, which contains a varying proportion of titanic acid—averaging probably ten per cent.—but as far as I can learn, never more than a trace each of sulphur and phosphorus. The following analysis represents probably an average specimen :

Magnetic Oxide	44.88
Oxide Manganese	2.05
" Titanium	9.99
" Magnesium	5.67
" Silicium	22.87
" Aluminum	10.64
" Calcium	0.65
Zinc	0.20
Water and loss	3.05
	100.00

Specific gravity 3.85

Metallic iron 32.5 *per cent.*, sulphur and phosphorus not detected.

This ore is conveniently located, of immense extent, and has for some time past been worked to supply a demand which has arisen for it in Pennsylvania. An effort is now being made, I am informed, to reduce this ore in Rhode Island, but to insure financial success I presume it will be found necessary to mix it with other ores of that vicinity.

One of these ores, and the second one referred to above, is the "Cranston Hematite." This deposit has not been worked recently, but I have looked forward with much interest to its exploration, as it was formerly one of the principal sources of supply in the State and, judging from the extent of the old workings, it seems a very promising deposit.

Two years ago I took a sample of this ore, which I had picked up near an old shaft, to Mr. Arthur Willis, the able chemist of the Siemens' Steel Works at Landore, South Wales, and, at my request, he made an analysis for the purpose of determining its value for steel making by the Siemens ore process, with the following result :

Peroxide Iron	76.285
Protoxide Iron	trace
Volatile matter	14.95
Silica	4.84
Alumina	2.10
Phosphoric Acid	0.45
Sulphuric Acid	0.12
Protoxide Manganese	0.08
Lime	0.50
Magnesia	0.41
Metallic Iron	54.40
Sulphur	0.039
Phosphorus	0.182

In the *calcined ore* we get *metallic iron* 63.6 per cent. The assay gave Sulphur 0.093, Phosphorus 0.095.

Owing probably to the fact that the capitalists of a cotton manufacturing district are naturally ignorant of iron making, the bed remained unexplored until the present time.

A day or two since, however, through the kindness of Mr. S. T. Thurber I received, for our collections, samples of ore obtained from the bed which, he informs me, has just been again opened.

He writes that "the vein is from 16 to 18 feet thick" and that another outcrops close by.

I am very anxious to see the mineral resources of my native State developed, and hope that this may prove a favorable time to place these facts before the readers of the JOURNAL.

STEVENS INSTITUTE OF TECHNOLOGY, May 27th, 1872.

Concerning Machine Belting.

Broadly considered, machine belting comprises both the round strand and the flat band, and ranges from the slender rawhide cord, appropriate to the spindle of a spinning-wheel, to the mighty six-ply rubber belt made a few years since for a Philadelphia paper manufactory, having a width of forty-seven inches and a length of one hundred and seventy-five feet. But whether small or large, or designed for little or great uses, the ordinary material for belting is expensive, and many substitutes therefor have been sought, in the main with indifferent success. The liability of india rubber belting to be spoiled by contact with grease is found in many cases a serious drawback to its use, while the cost of leather will always be kept up and fail to afford a fair margin for profitable use, from the simple fact that forty-five per cent. of the tanned hides used in its fabrication is absolute waste as far as this branch of manufacture is concerned. Attempts to utilize this waste have been suggested, but the material produced can hardly have proved adapted to the purpose for which it was designed. Sheets of artificial leather, made from pulped fragments, were to be glued, seamed or cemented together to constitute the belt, and in some cases were to be strengthened by strips of canvas or by wires extended longitudinally. Another use of the pulped waste was suggested in its application to the thinner parts of ordinary leather belts in order to secure a uniform thickness throughout their entire length. But it is manifest that no cement would hold the extraneous layer firmly in place under the repeated stress of bending around pulleys, and thus the advantage claimed as just noted would be quickly lost, while any material addition to the strength of the belt by such means would obviously be out of the question. The strengthening of a belt by the introduction of wire at the same time flexible and possessed of great tensile strength has a certain plausibility about it which renders it worthy of more careful trial than it has yet received. The plan has been attempted, we believe, with paper belting, but with what results we are not informed. For light machinery it would very likely answer a good purpose, and in its production it is more than likely that the processes of the Japanese, in the manufacture of their firm and elastic "leather paper," could be adopted with advantage. The most promising field, however, for improvement in the manufacture of machine belting will be found in the production of some substitute for rubber in cementing "plies" of textile material into bands of requisite size and strength. This once provided at a less cost than rubber, and capable of subserving the same functions without danger of deterioration from the action of oily materials, would constitute one of the most important among the forward steps possible in this by no means inconsiderable branch of manufacture.

Malleable Cast Iron.*

BY R. H. TERHUNE, E.M.

The enormous production of pig iron, together with the many difficult and interesting problems with which its manufacture is fraught, has secured to this industry the exclusive attention of scientists with reference to the chemistry of iron, while some

* Read before the American Institute of Mining Engineers, New York, May, 1872.

of the minor departments of its metallurgy have suffered neglect. Particularly is this true of the manufacture of malleable castings, an art, nearly a century discovered, and yet without any history or literature. When cast iron is exposed at high temperatures to oxidizing substances, a portion or all of its carbon is removed, depending upon the following conditions: the degree and the continuity of the heat; the richness in oxygen of the compound which supplies it; the physical condition of this oxidizing agent, and the facility with which it yields its oxygen for the purpose of reduction.

The process, therefore, is the reverse of cementation and "case hardening," operations by which carbon is *imparted* to iron by exposing the metal at high temperatures, to charcoal or organic substances, producing steel or steely iron. In the present stage of the manufacture of malleable casting it is sought to eliminate a *single* element only, while in the puddling of iron and the production of steel in the Bessemer converter it is sought to remove *all* foreign matter, magnesium, potassium, carbon, silicon, sulphur, phosphorus, &c., the common ingredients of pig iron. In the one case, solid iron is enveloped in a solid oxidizing agent, in the latter two, melted iron is perforated with streams of air, or exposed by mechanical means to the action of the atmosphere, as well as solid substances, which afford oxygen. In the converter and puddling furnace, the conditions of perfect combustion exist, and those of purification are good, as the fluid metal enables the lighter solid products to rise to the surface, and thus separate from the bath. In a casting, in the annealing process, it is obvious that the only products of combustion which are removed are the gaseous; the solid, if any are formed, must remain in the iron, injuring it, as oxides, silica, lime, &c. These, then, are the cardinal distinctive features of the two processes; the one which is our subject must be described, before theoretical considerations are possible, to such as are not familiar with it. In order to obtain practical data, it was necessary to visit some typical works. These I have found in the establishment of Messrs. Harrison and Kellogg, Troy, N.Y., visiting as a member of the Institute, who were invited to do so, during the Troy session. They are the oldest firm in the country, and foremost in the application of science to a novel and legitimate field. They use charcoal iron exclusively; for some unexplained reason the best coke and anthracite irons have not proven available; numbers 3 and 4 are the usual numbers, although from number 1 to number 6 have been used. Fusion is effected in a cupola, or the common air furnace, having a low hearth and very long flue; in the cupola, the charge is 1,400 lbs. with one fifth its weight of Lehigh coal; in the air furnace the charge is 2,400 lbs. with half its weight of Cumberland coal, and crude petroleum. In the latter practice, contact of fuel and iron is of course avoided, which may compensate, in case of sulphurous coals, for the greater amount of fuel. Whenever the fusion is effected, the iron is maintained in the melted condition, in the air furnace, for about an hour; the object being to secure a white, hard and homogeneous iron; the quality of the metal at this stage is determined by the fracture of a small ingot cast at intervals; sound is also a guide to hardness. The operation of casting is simple and ordinary; patterns for molds are often of brass or iron, and chilling pieces are introduced at the thick parts, to secure a uniform product. For annealing, the articles are placed in sectional *cylinders*, two feet in diameter, for convenience of packing and removing, with alternate layers of forge scale, which is driven into all the interstices, to secure an intimate contact with the metal to be decarburized. The packed cylinders are provided with luted covers for the exclusion of air, but more especially carbonic oxide (which, by its presence, would entirely vitiate the process), and are placed in furnaces, about 7 ft. square, 5 ft. in height, with arched roof, and flues in the walls and hearth to secure a proper distribution of heat. Eight days are required for conversion into the malleable iron of commerce, and the *quality of the product is always doubtful; the apparent precise conditions which one week produce a superior article, will again result in worthless brittle castings.* It is this fact that commends this department of metallurgy to the student as an interesting and, perhaps, profitable field of inquiry, and affords to the manufacturer convincing evidence of the inadequacy of empirical knowledge to the perfection of the art, or even a plausible explanation of contingent phenomena. The reasons that the cheaper coke and anthracite iron cannot be used, as reported, can only be chemical ones. The object of the prolonged fusion in the air furnace, in a reducing flame, practically secured by causing it to issue 15 ft. from the flue bridge is not very apparent. The iron, theoretically, should be white and homogeneous, the carbon should exist in the combined state, and the metal must be as free as possible from sulphur, phosphorus and silicon. The reducing flame employed would not eliminate any of these elements, except by volatilization, although prolonged fusion would change the state of the carbon. It has been suggested that the removal of graphitic or mechanically diffused carbon from the finished casting in the process of annealing, would leave cavities throughout the mass, and possibly the imperfect change into the chemical state, of this carbon, may be one of the mysterious causes of frequent failure. On the other hand, if too small a percentage of foreign elements be present, it would not answer for casting. Phosporus would produce fluidity, as does graphitic carbon in foundry iron, but the objections to both are apparent.

Hence, in the selection of iron, a variety must be chosen as poor in foreign matter as is consistent with the *production of a casting.* We might infer that the oxidation of silicon, etc., was coincident with that of carbon, and that the *oxides* in the iron would be sources of weakness. If the oxidizing agent was inferior, if it agglutinated, which is the objection to iron ores, pulverized, the carbon itself might not be attacked; forge scale is free from this objection, but the restoration of its oxygen with chloride of ammonium, after use, may be imperfect. Various durations of exposure in the furnace should be tried, with the hope of obtaining a product akin to steel in its proportion of carbon. There are produced annually in the United States about 25,000 tons of malleable castings of a great variety of small articles requiring cheapness, tenacity, and an intricacy of form unattainable by any other known method. The increase of this produce will doubtless be commensurate with the growing substitution of iron for so many other materials in the arts, and, although it is true that the present depth to which iron can be decarburized by this process is slight, it is not fanciful to say that large masses may yet be toughened throughout, giving them value for economical engineering. Analysis of material and product is a fundamental need; by it the changes in each stage will be learned, and perhaps a clue offered to the causes of loss and uncertainty.

Steam Tillage.

Among the unsolved problems of mechanical engineering, that of steam tillage, in this country, ranks the foremost; and there are none in which greater promise of reward for success are held out, and none, either, in which more preposterous methods have been proposed, nor are there any in which less guidance can be had from foreign experiment and experience, for the machinery found practical and profitable with the cheap labor on the stiff clays and fen lands of England, will prove profitless when run by high-priced American labor upon the light soils peculiar to those regions where steam plowing must, when at all successful, find its widest application. A possible exception to the general proposition thus laid down may be found in the sugar fields of the South, where, as on the Magnolia plantation, the yield per acre may be materially increased by the simple adoption of the best British steam plows, driven by engines of greater horse-power than in English tillage, because of the extreme depth of furrow which long trial has proved most advantageous on the lands and for the crop referred to.

The favorite plan among projectors of steam plows in this country, is that of direct traction, in other words a locomotive made to run upon the ground instead of on rails, and drawing a gang of plows behind it. The simplicity of this system has lead to experiments with it by dozens of inventors, during a period extending over more than fifty years. But the slip of the wheels has nullified all attempts, and although we hear of a new road steamer building in the vicinity of New York, which the owner believes capable of drawing a gang of plows turning seven furrows eight inches deep, the uniform failure of preceding machines operating on the same system, leads us to a reasonable doubt of his success. The difficulty with direct traction, be it mentioned, is not in overcoming the ordinary obstacles, for we have seen a rubber tired engine draw a gang of seven plows through a stiff sod with no apparent difficulty, but in meeting obstacles which, though exceptional in kind, are of frequent occurrence in practice. For example, in the case just noted, the engine ran one of its wheels into an ant hill, and half an hour was consumed in getting it out. Of course, some means not yet thought of may be devised for helping the locomotive out of such difficulties, and this done one of the objections to direct traction disappears.

In this connection it may be noted that, should plows hauled by locomotives ever be adapted for tillage, there will probably be developed a wide difference between the engines thus used and those applied to hauling purposes on smooth and well made roads. A vertical boiler, double cylinders and elastic tire will answer best for the former, albeit the tire must be much more cheaply made than the annular cushions of the Thompson engine. While the horizontal boiler and single cylinder with balance wheel will answer quite as well on the latter, with a materially reduced first cost, and less probability of extensive and expensive repair when subject to rough usage.

The purely American system of steam tillage, however, is yet to come. Quite a number of plans, each claiming this title, have been proposed by sanguine inventors, but none of them have been reduced to practice except in the case of a spading machine tried, we believe, in Illinois, some four or five years since, and a California rotary plow for which much was asserted, but which we have been informed was two years ago laid up by the roadside and left to rust. Two or three methods of applying rope fraction, differing essentially from the English, have also been suggested, and one or two seem to have possessed at least a theoretical feasibility. But none of these, so far as known, have progressed beyond very crude drawings and clumsy models.

But whatever system of construction may ultimately prevail, the introduction of steam-plowing machinery will be best secured, and will doubtless necessarily depend upon the adoption of the foreign practice of forming companies owning the machines and plowing for farmers by contract. Should this obtain, there would naturally arise a spirit of competition among different companies, which would lead to a brisk demand for new improvements, and this once started, steam plowing would progress more in five years than it has, in this country, been able to do in the last quarter of a century.

The Copper Mines of Chili.

BY JAMES DOUGLAS, QUEBEC.*

CONTINUED FROM PAGE 363.

Although the lode is not producing in depth as well as it did in the upper levels, the yield has not fallen off, so great are the reserves of good ore left to

* Republished, with the revision and corrections by the author, from the London *Quarterly Journal of Science.*

draw upon. The following table of the expense and production from 1862 to 1870, kindly furnished me by Mr. McAuliff, gives a good idea of the immense amount of work done and copper produced from a single large Chili mine :—

Year.	Annual Outlay. Dols. Cents.	Annual Production in Quintals Metrico.	Percentage.	Cost of Extraction per Quintal. Cents.
1862	113,981 06	224,789 70	15½	51
1863	118,150 75	248,939 43	15½	48
1864	158 661 20	352,453 16	15½	45
1865	157,986 51	240,317 18	15	66
1866	145,449 13	261,590 44	15	56
1867	140,409 76	245,473 08	13 4-10	57
1868	117,952 43	178,018 39	15	66
1869	119,329 37	203,600 13	13½	59
1870	159,702 00	266,000 00	13	60
	1.231,622 01	2,220,641 51		

The metrical quintal is equal to 1·971 English cwts.

About 4000 quintals monthly of rich oxidised ores are still extracted from the outcrop of the lode by tributers, consisting of carbonates and small quantities of black and red oxides, and oxychloride.

The Portazuela and Bazanillo Alto, owned by Messrs. Gonzales and Templeman, yield about as much. The same deterioration in depth has, however, there taken place as in the Mondaca.

Desmontes heaps cover the whole northwest face of the hill. They contain probably 300,000 tons of 3 to 4 per cent. ore. The metal as broken from the lode probably carries about 6 per cent. of copper, for it takes 3 tons to yield 1 ton of 13 per cent. stuff, and the 2 tons thrown away contain about 3 per cent. It is found that the loss in picking, when the ore is broken by a Blake, exceeds that incurred when hand labor is employed ; hence the tributers refuse to use it, but all the large mines find economy in treating the mine ores by it.

Some of the ore is sold to the smelting works on the coast, but most of it is heap-roasted and run into regulus at two establishments in Carrizal Alto, near the mines, and at two others at Canta del Agua, 5 miles from the mines, on the road to Carrizal Bajo.

The scarcity of water entirely precludes water-dressing at the mines. For a time a dressing establishment was run with success by Mr. Ovalle at the Canta del Agua, the water being obtained by cutting across the valley, and arresting the brackish water which filters through it from the plain of Algaroval towards the sea. The water flows in good sized streams into the eastern edge of that plain from the Andes, but is soon lost in the sand. In its long passage through miles of soil it becomes saturated with soluble mineral matters, and among others with salts of lime, which in the Canta del Agua form thin beds of limestone of great purity. The strata of soil in the Canta del Agua are :

yard of loose sand, pebbles, and salt.

½ yard of { sand alternating with thin layers of carbonate of lime, which on removal rapidly reform.

Sand and clay.

Old river bed—a compact mass of shale and boulders of undetermined thickness impermeable to water, and on which it flows.

Following the Canta del Agua into the plain of Algaroval, and across it in a south-east direction, the railroad runs to Yerba Buena, 71 miles from Canta del Agua, and 99 from Carrizal Bajo on the Pacific. This station is at the foot of the spur of the Andes, where occur the argentiferous copper lodes of Cerro Blanco. The lodes yielded at surface antimoniate of copper rich in silver ; this changed at about 30 fathoms to argentiferous copper glance and galena, and the grey copper was replaced by copper pyrites, which is now the prominent product, though small quantities of the other ores are still exploited. The principal mines have been yielding largely and profitably for some years. Besides the principal lodes at Carrizal and Cerro Blanco, there are innumerable others worked on a small scale by two or more poor miners, the yield from all of which combined is considerable.

The next copper deposits worthy of note lie between Copiapó and Nantoko, in the hills bordering the river of Copiapó. They are exceedingly numerous and yield rich oxidized ores; but none of the mines are worked in the same systematic manner as those of Tomaya and Carrizal, nor do any of them promise to rise into great importance. On the contrary, partly from the unskilful way in which they have been worked, and partly from the high percentage required by the smelter (18 per cent.), which no mine can continue to give after the rich outcrop has been removed, unless water dressing is possible, the yield of the Copiapó copper mines must continue to fall off.

Not so, however, that of the great mines back of the port of Chañaral, in the desert of Atacama. From Chañaral de las Animas, on the Pacific, the valley of the Rio Salado, in which water flows only after such exceptionally heavy rains as may fall twice or thrice in a century, runs almost due east and west for about 10 leagues to the mines of La Salado ; and at about half that distance a valley enters from the south-east, in which is the *mineral* of Las Animas. From the Caleta de las Animas, the former port of the *mineral*, the first shipment of copper from Chili is said by Dr. Philippi to have been made to Europe, in a whaler, in the year 1820. It came from the mines of Las Animas, shortly before discovered by Don Diego de Almeida. The lodes of La Salado were not discovered until about 1840. Since then both districts have been worked with very varying fortune, and perhaps more money has been lost than in any other Chili mines, owing to the cost of mining with high wages, dear provisions, total lack of water, and long carriage. A railroad, however, has just been opened from Chañaral to La Salado, so that the yield of both *minerales*, large as it is at present, will probably be notably increased. The metals are smelted in part at the port, in part at Mr. Sievert's establishment at Pan de Azucar, and partly sent south. Very little can be picked to a high enough grade for shipment to England.

A ride of five hours across the hills to the north brings one to the Mina Descubridora de Carrizalillo, owned by the estate of Mr. Watters, much of whose ore is rich enough to bear exportation from the port of Pan de Azucar to England. Watters's curious and rich San Pedro mine lies about eighteen leagues in the interior, a little north of Tres Puntas ; and at a still greater distance in the interior, some 40 leagues back of Pan de Azucar, is Sievert's Esploradora Mine, the last of a chain of mines between the coast and the Cordillera, worked by the same indomitable owner, who, in making such out-of-the-way mines pay without the aid of a railroad, has performed one of the greatest mining feats in South America.

All these mines together produce about 7,000 tons fine annually.

Still further north, along the coast of Chili and Bolivia, as far as Tocopillo, are innumerable copper deposits, as at Paposa, El Cobre, and Cobija, which yield in abundance 5 to 10 per cent. carbonates, oxychlorides, and other oxidized ore ; but the distance from fuel, and the difficulty in most instances, of picking the metal to a high percentage, have prevented their being profitably worked ; though considerable quantities of metal are smelted at Taltal or sent south to Lota.

The *barilla* of Bolivia is native copper, which occurs disseminated in fine grains through a bed of sandstone. It extends and probably retains its cupriferous character from Corocoro, in Bolivia, to San Bartolo, in the northern part of the Desert of Atacama, in Chili, through an extension of 5½° of longitude. It was worked at San Bartolo by the Indians before the Spanish conquest ; and since then one or two unsuccessful attempts have been made to re-open the mines, but the difficulty of transport through the desert has effectually frustrated them. From Corocoro, however, though the metal has to be brought on mule-back for 70 leagues to Tagua, and thence by rail to Arica, the port of shipment, some 2,000 tons (fine) are annually exported, which is yet only half of what was formally produced.

The foregoing are the main sources of supply of the copper, the news of whose fortnightly shipments are looked forward to by all copper miners and speculators most anxiously, as affecting so sensitively the price of the metal.

In round figures, the several mineral districts above enumerated may be said to yield as follows :—

	Tons.
Southern Chili, south of the Maipochô and Maipu rivers	1000
Catemo, and the districts of Potorca, Illapel, and Combarbola	9000
Tomaya	3000
Panulcillo, Cerillos, Tambillos, and Andacollo	3000
Brillador Mine, Higuera, and small mines in the northern part of the province of Coquimbo	3000
Peña Blanca, including San Juan and Lebrar	1000
Carrizal	8000
Cerro Blanco	2000
Copiapó	6000
Chañaral and mines of Mr. Watters and Mr. Sievert	7000
Coast mines of Bolivia and barilla	5000
	48,000

Are these several districts going to maintain their yield ?

Wherever any quantity of copper is produced by poor miners, working on their own small mines, there will doubtless be a notable falling off. Wages are daily rising. The Chili *peon* can get one dollar a day on the Peruvian railroads, and will therefore no longer work at home for 25 cents. Numbers of small mines, yielding each a few tons of picked ore annually, and which paid their workers—who were often at the same time owners—small wages, are being abandoned. Though the yield from each may be insignificant, their total production is by no means trifling. A great deal of the copper smelted at Guayacan and the Copiapó establishments is bought in small parcels of a few cwts. each ; the Catemo district especially will suffer from this cause. On the other hand, improved methods of treatment are leading to certain ores being treated which would formerly have been deemed valueless. An experiment is now being made on some very extensive beds of 4 to 5 per cent. purple sulphuret near Tiltil, on the eastern slope of the coast range. They occur at an elevation of 5700 feet above the sea, and so perpendicularly above the nearest spot, suitable for a concentrating establishment, that an aërial wire-road, which carries the ores from the mines, descends 2250 feet to the mill, with an average grade of 33 deg. There is during most of the year water enough for buddling, which is effected by eleven concave buddles, for which the ore is crushed by a Blake, four sets of steel-jacketed rolls, and a battery of twelve stamps. The Hunt and Douglas method is used for reducing the ore to metal in the wet way. It is a bold attempt, surrounded with many difficulties ; but being under the management of Mr. Waring, one of the best mechanical and mining engineers in Chili, it bids fair to be remunerative. If the experiment succeed, other deposits of a like nature will be worked, and may supply the deficiency certain to arise from the causes just referred to.

TO BE CONTINUED.

Notice.

This number of the Engineering and Mining Journal will be sent to all members and associates of the American Institute of Mining Engineers who paid their dues last year, and to all who were elected at the New York Meeting. We shall continue to send the Journal in this way for a few weeks, to give all an opportunity to pay the dues for the present year, and not to lose any numbers of the paper by reason of a slight delay in such payment. But members and associates will please bear in mind, that if they do not at once pay up (by remittance to Martin Coryell, Esq., Wilkesbarre Pa., Secretary,) their respective $10, they will have no right to complain, should the Journal be suddenly stopped, and should *no back numbers* be afterwards available, for love or money

THE COAL TRADE.

NEW YORK, June 7, 1872.

Anthracite.

The market holds its own, without noteworthy change. The talk of strikes in the coal regions is quite baseless, so far as any extensive movements of that kind are concerned. The miners are not so foolish as to give up, in the present condition of the trade, their chance of continuous occupation.

It is true that a slight trouble arose a day or two ago at one of the collieries of the Spring Mountain Company. The story, according to the best authority we can find, is that a man was discharged, for personal reasons, and that, being a member of the Union, his discharge was represented to be a piece of persecution on that account; and the miners struck in consequence. He found employment with a contract miner in another colliery; but was warned to leave, by the proprietors. This being also looked upon as a measure of hostility to the Union, the miners at several collieries struck in consequence. Each side claims that the decision of Judge Elwell has been violated by the other. The miners insist that they have the right to hire their own laborers, and the operators say that they have no right to hire as laborers men discharged for cause or on strike from other collieries. The motive causing the discharge of an employee is always a difficult matter to determine; but it seems absurd, where hundreds of men belonging to the Union are employed, to ascribe the dismissal of any one man simply to his membership.

But the real point at issue is the question, whether an operater has any right to say who shall be employed in his mine, even by miners who work on contract and engage their own laborers. Some control of this matter must be vested somewhere; it is, for instance, imperatively necessary to proper discipline and safety that reckless, drunken or untrustworthy men should be prevented from working in the mines. The operators mean to insist on this point and they are likely to win the victory, at least for the time being. Indeed the Spring Mountain Company's officers declare to-day that the strike is already virtually over, and that it rests with the Company to say whether the men shall be allowed to return to work. The collieries yesterday reported on strike were Jamesville, Beaver Brook, Treskow and Honey Brook.

Bituminous.

The low prices in Anthracite have caused some dullness in the bituminous trade. The Cumberland companies will not change their prices at all in consequence of the new tariff, the effect of which was discounted long ago, when rates were put at the lowest reasonable point. There they will stay.

Anthracite Coal Trade for 1871 and 1872.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending June 8, 1872, compared with the week ending June 10, 1871.

COMPANIES.	1871. WEEK.	1871. TOTAL.	1872. WEEK.	1872. TOTAL.
*Phila & Reading R. R†	157,015	1,590 112	137,347	2,276,196
Schuylkill Canal	.....	175,436	.....	250 768
Lehigh Valley R. R.	30,081	572,966	66.119	1,532 976
Lehigh & Sus. R. R.	33,978	343,032	40,172	711,661
Lehigh Canal	15 367	51 970	21,936	1^9,569
Scranton North	13,6:4	43,986	15 410	289,423
" South	45,822	102,796	45.167	939,6 6
Penn. Coal Co., rail	24,371	58,779	23,446	499,178
" " " canal	711	711	240	1429
Del. & Hud. Canal Co.	41,^37	101,354	59,4^4	315,827
" East	8,9 6	69,148	13,573	289,488
" West	2,859	19,059	8,453	151,333
" South	6,442	50,559	9,148	153,333
Shamokin	11,3 4	267,574	12,689	2^9,574
Trevorton	.....	.....	.....	.....
Lykens Valley Coal Co.	2,253	33,956	..	2,580
Wyoming South	....	.....	....	....
Wyoming North	.....	.....	....	....
P. N. Y. C. & R. R. Co.	4,479	48,758	10,816	286,492
Williamstown Col'y	...	17 847	....	.....
Big Lick Col	3,084	54,874	....	10,591
Total	469,288	3,604,911	461,099	8,127,014
1870	....	....	400,288	3,604,911
Decrease	.....	.....	.....	.....
Increase	.....	.....	63,722	4,522,103

* These figures are for the week and fiscal period commencing Nov. 30.

† Less coal transported for Co's use and Bituminous coal.

Bituminous Coal Trade, 1871 and 1872.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending June 8, 1872, compared with week ending June 10, 1871.

COMPANIES.	1871. Week.	1871. Year.	1872. Week.	1872. Year.
C. & O. Canal	18,778	251,403	18,978	212.794
B. & O. R. R.	29 112	520,328	26,649	522,947
H. & B. T. R. R.	6,847	165.496	6,919	131,240
*Harrisburg & D.	11,551	266 806	12,052	250,182
*L. V. R. R.	.....	37.725	530	14,381
P. & N.Y.C. & R. Co.	6,483	133,061	7,^46	166,984
Cumberl'd Branch Canal	5 675	74,667	5,^^3	67,785
" Railroad	1,677	33,390	496	6,512
Total	80,123	1,482,386	79,333	1,373,823
	79,333	1,372 823		
Decrease	790	109,563		

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, June 8, 1872.

BY RAILROAD—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB. VAL. BRANCH.

	Tons. Cwt.
From St. Clair	35,831 15
" Port Carbon	4,585 05
" Pottsville	3,435 13
" Schuylkill Haven	26,041 14
" Pine Grove	6,296 05
" Tamaqua	15,173 05
" Harrisburg	29 17
" Dauphin	6,023 13
Total	97,476 17

FOR SHIPMENT BY CANAL.

Passing Frackville Scales	10,167 02
" Mill Creek "	3,448 01
" Schuylkill Valley Scales	985 04
" Mt. Carbon "	732 00
" Cressona "	8,650 03
" Pine Grove "	.....
" Tamaqua "	1,389 04
Total	25,349 14

SHIPPED WESTWARD VIA NORTHERN CENTRAL RAILROAD.

Passing Locust Gap	2,523 11
" Shamokin	5,459 01
" Herndon	.....
Total	7,984 12

SHIPPED WEST OR SOUTH FROM PINE GROVE.

Via Schuylkill & Susquehanna R. R.	1,270 05
" Lebanon & Pine Grove Branch	886 05
Total	2,156 10

CONSUMED ON LATERALS.

From Frackville Scales	138 01
" Mill Creek "	380 10
" Schuylkill Valley Scales	1,116 04
" Mt. Carbon "	624 02
" Cressona "	133 02
" Pine Grove "	114 05
" Tamaqua "	376 17
Total	2,882 01

LEHIGH AND WYOMING COAL.

Received via Allentown, L. Penn'a Br.	42 01
" " Alburtis, " "	.....
" " Oreland, G. & N. Br.	865 15
" " Connecting R. R.	.....
" " Willow Street R. R.	589 04
Total	1,497 00

BITUMINOUS.

From Harrisburg	12,051 19
" Connecting R. R., G. & N. Br.	.....
" Junction R. R.	.....
Total	12,051 19

COAL FOR COMPANY'S USE.

Anthracite	6,385 04
Bituminous	285 12
Total	6,670 16

RECAPITULATION.

	Total for Week.	Corres-p'g week last year.	Increase and Decrease.
Passing over Main Line and Leh. Val Branch	97,476 17	116,712 17	d 19,236 00
For Shipment by Canal	25,349 14	31,589 05	d 6,240 11
Shipped Westward via Northern Central R. R.	7,984 12	4,391 12	i 3,593 00
Shipped West or South from Pine Grove	2,156 10	1,545 18	i 610 12
Consumed on Laterals	2,882 01	2,815 14	i 266 87
Lehigh and Wyoming Coal	1,497 00	158 18	i 1,338 02
Total Anthracite paying freig't	137,346 14	157,615 04	d 19,668 10
Bituminous	12,051 19	11,551 00	i 500 19
Total of all kinds paying freig't	149,398 13	168,566 04	d 19,167 11
Coal for Company's use	6,670 16	4,383 08	i 2,287 08
Total Tonnage for Week	156,069 09	172,649 12	d 16,580 03
Previously this year	2205791 03	1735648 08	i 710,142 15
Total to date	2061869 12	1968298 00	i 693,562 12
SHIPPED BY CANAL.			
From Schuylkill Haven	22,842 10	30,185 09	d 7,342 10
" Port Clinton	1,400 00	2,441 00	d 1,041 00
Total Tonnage per Week	24,242 10	32,626 09	d 8,383 10
Previous y this year	250,767 19	186,055 07	i 64,712 12
Total to date	275,010 09	218,681 07	i 56,329 02

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company for the week ending Saturday, June 8, 1872.

	WEEK.	SEASON.
North	55 350 08	1,103,723 10
South	9,148 08	153,831 17
Total 1872	64,498 16	1,262,655 07
Corresponding time in 1871:		
North	53,329 02	128,199 02
South	6,441 17	50,559 00
Total	59,770 19	178,758 02
Increase North		
Decrease North		
Increase South		
Decrease South		
Total decrease 1872		
Total increase 1872	4,727 17	1,083,897 05

Delaware and Hudson Canal Company.

The following is a statement of Coal Transported by the Delaware and Hudson Canal Co. for the week ending June 8, 1872.

	FOR THE WEEK.	FOR THE SEASON.
By Delaware and Hudson Canal,	48,494	345,827
By Railroad, East	13,573	289,488
" " West	8 463	151,333
" " South	9,148	153,333
Total Tons	80,668	939,981

For the same period last year.

	FOR THE WEEK.	FOR THE SEASON.
By Delaware and Hudson Canal,	41,837	101,358
By Railroad, East,	8,056	69,148
" " West	2.859	19,059
" " South	6,442	50,569
Total Tons	59,194	240,124
Increase	599,857	

Penn. and N. Y. R. R.—Coxton, Pa.

Coal tonnage for week ending June 8, 1872.

	Week. Tons. Cwt.	Total. Tons. Cwt.
Anthracite received:		
From Lehigh Valley R. R.	8,057 06	170.818 13
" Lack. & B. R. R.	1,803 18	40,242 16
" Pleasant Valley R. R.	724 04	47,194 14
" Sul. & Erie R. R.	231 01	28,236 06
Total	10,816 09	286,492 09
Distributed:		
To Lehigh Valley R. R.		24,199 16
To Lack. & B. R. R.		1,017 17
To S. Central R. R.	1,705 11	52,099 10
To Ithaca & A. R. R.	483 03	54,021 16
To Erie R. W. Pockets for shipm't.	6,819 18	108,949 17
To individuals on line of road	242 07	12,260 07
To points at & above Coxton for use of Co	493 13	12,918 18
To points between Waverley and Elmira	1,080 17	21,033 08
Total	10,816 09	286,492 09
Bituminous received from BARCLAY R. R.		
Shipped north from Towanda	7,912 05	165,818 04
Shipped south from Towanda	13 14	1,072 12
Northern Central R. R.	....	91 01
Total	7,925 16	166,981 17
Distributed:		
To Erie Railway	6,939 17	147,255 11
To So. Central R. R.	972 08	18,310 18
To Ithaca Valley R. R.	.....	21 15
Lehigh Valley, R. R.	6 12	841 08
To individuals on line of Railroad	6 19	306 00
To points on line of road for use of Company	.....	146 05
Total	7,925 16	166,981 17
Grand totals transported:		
Anthracite	10,816 09	286,492 09
Bituminous	7,925 16	166,981 17
Total	18,742 05	453,474 06

Delaware Lackawanna & Western Rail Road Company.

Coal transported on the Delaware, Lackawanna, & Western Railroad for the week ending Saturday, June 8, 1872.

	WEEK. Tons. Cwt.	YEAR. Tons. Cwt.
Shipped North	15,409 14	280,423 02
Shipped South	45,167 06	939,656 04
Total	60,577 00	1,220,079 06
For the Corresponding time last Year:		
Shipped North	13,613 12	49,936 01
Shipped South	45,822 01	102,795 17
Total	59,435 13	152,781 18
Increase	1,141 07	1,067,297 08

Lehigh Canal Coal Trade.

Shipped for the week ending June 7, 1872.

	Week. Tons. Cwt.	Week. Tons. Cwt.
Total from Mauch Chunk Region	8,385 02	67,300 17
" " Beaver Meadow "	3,117 13	32,546 07
" " Treskow "	954 11	8,725 05
" " Mahanoy "	460 02	3,237 01
" " Hazleton "	6,140 19	58,774 17
" " Upper Lehigh "	1,229 14	7,672 12
" " Wyoming "	1,650 15	11,252 02
Total	21,935 16	189,509 02
Corresponding week last year	15,366 16	51,970 09
Increase	6,569 00	137,538 13
Decrease		

Statement of Coal Transported over Cumberland and Pennsylvania Railroad

During the week ending Saturday June 8, and during the year 1872, compared with the corresponding period of 1871.

WEEK.

	To C. & O. Canal Tons. Cwt.	To B. & O. R. R. C. Tons. Cwt	Total, Tons Cwt.
1872	18,978 14	26,648 12	4 ,627 04
1871	18,717 14	29,111 11	47,889 05
Increase	260 18	2,462 19	2,262 01
Decrease			

YEAR.

1872	212,793 19	522,947 10	735,741 09
1871	210,403 14	520,328 04	771,731 08
Increase	.....	2,619 06	
Decrease	38,609 05		35,989 19

Cumberland Branch R. R.

WEEK.

	To C. & O. Canal. Tons. Cwt.	To B. & O. R. R. Co Tons Cwt.	Total. Tons. Cwt.
1872	5,783 01	495 13	6,278 14
1871	5,675 10	1,676 12	7,352 02
Increase	107 11		
Decrease		1,180 19	1,073 98

YEAR.

1872	67,784 12	6,511 14	74,296 06
1871	74,666 13	33,299 16	107,966 08
Increase			
Decrease	6,882 01	26,788 01	33,670 02

Shamokin Coal Trade.

For week ending June 8, 1872	12,689 04
Same time last year	11,303 15
Increase	1,385 09
Decrease	
Total amount shipped to date	305,053 18
Same time last year	267,574 02
Increase	60,519 16
Decrease	

Report of Coal Transported over Central R.R. of N. J. (Lehigh and Susq. Div.)

Week ending June 8—Compared with same time last year.

WHERE SHIPPED FROM	WEEK 1872, tons ct.	WEEK 1871, tons ct.	YEAR 1872 tons cwt.	YEAR 1871, ons.cwt.
Wyoming Region	37415 15	41340 06	572692 05	357775 14
Upper Lehigh Region	3978 12		84091 13	4614 06
Beaver Meadow Region				
Hazleton Region	6375 04	57 09	64213 08	1802 01
Mahanoy Region				
Trescow Region	4147 06	229 09	47745 18	1565 11
Mauch Chunk Region	9919 11	7436 11	185531 00	42728 18
Totals	61856 08	49063 15	951777 04	408486 10
Increase	12792 13		543290 14	
Decrease				
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	40172 10	33977 12	711669 11	343031 16
Forwarded East of Mch Chunk by Canal	14239 13	7820 16	115103 19	22831 01
Delivered at and above Mauch Chunk	1004 06	1157 05		
L. V. R. R at Packer'n	307 14	3454 06	27645 14	23877 07
Delivered to L. & B. R. R.at Plymouth Bridge	6132 05	2653 16	90268 12	5683 11
Totals				
Of the above there was transported on acc'nt of L. C. & N. Co.	16160 19	17855 12	239732 01	50759 10
W.-B. C. & I. Co.	24217 03	27380 13	405376 11	290226 19
Totals	40378 05	38236 05	645108 12	340986 09
Increase	2141 17		304122 03	
Decrease				

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for the week ending June 8, 1872, with totals to date, compared with same time last year.

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL Tons. Cwt.
Total Wyoming	10,704 14	266,888 05
" Hazleton	47,270 06	1051,613 08
" Upper Lehigh	5 12	1,550 08
" Beaver Meadow	16,417 04	375,753 08
" Mahanoy	12,293 13	173,693 09
" Mauch Chunk	28 12	1,692 19
Total	86,719 11	1,870,991 17
Same time last year	36,182 19	649,443 04
Increase	50,536 12	1,221,548 13
Decrease		
Forwarded East from Mauch Chunk by rail	66,119 08	1,532,975 17
Same time last year	39,081 04	572,966 13
Increase	27,038 04	960,009 04
Decrease		

DISTRIBUTED AS FOLLOWS.

Forwarded East from Mauch Chunk by rail	65,414 19	1,506,595 18
do East for use L. V. R. R	704 09	26,979 19
Delivered at and above Mauch Chunk for use of L. V. R.R.	1,119 13	39,943 03
To P. & N. Y. R. R	8,057 06	170,818 13
To N. C. R. R., at Mount Carmel	415 10	1,322 12
To D. H & W. R. R	531 02	13,782 05
To L. & S. R. R. at Packerton for rail	346 10	7,213 01
Delivered at M'h Chunk	46 12	1024 02
Delivered on line of road above Mauch Chunk	255 10	10,120 04
To L. & S. R. R., at Penn Hav., for railroad		3,959 07
Do. for canal	6,140 19	59,241 04
To Lehigh Canal Mauch Chunk	3,667 17	37,895 04
To Catawisa Railroad	19 14	3,705 03
Total	86,719 11	1,870,991 17

Lehigh Coal and Navigation Company,

Report of Coal transported over the Lehigh Canal and L. & S. Div. of Central Railroad of New Jersey for the week ending June 8, 1872, and for the year 1872.

	WEEK.	YEAR.
Forwarded East of M'ch Chunk by Rail	40,172 10	711,669 11
Delivered at and above do.,	1 004 06	27,645 14
Forwarded East of do., by Canal	21,935 16	189,509 02
	63,112 12	928,815 07
Corresponding period last year—		
Forwarded East of M. Chunk by Rail	35,977 12	313,031 16
Delivered at and above do.,	1,157 05	23,877 07
Forwarded East of do., by Canal	15,366 16	51,970 09
	50,501 13	418,879 12
Increase on Railroad		
Decrease " "	6,041 19	372,397 02
Increase on Canal	6,569 00	137,538 13
Decrease " "		
Of the above there was transported on account of—		
Lehigh Coal Nav. Co.	24,546 01	307,032 17
Wilkesbarre Coal & Iron Co.	24,217 03	405,376 11
	48,763 04	712,409 09
Corresponding period last year—		
Lehigh Coal & Nav. Co	20,034 11	83,215 06
Wilkesbarre Coal & Iron Co.	27,380 13	290,226 19
	47,415 04	373,442 05
Increase	1,348 00	338,967 04
Decrease		

Pennsylvania Coal Company.

Shipments of Pittston Coal for the week ending June 8, 1872.

	1872. WEEK.	1872. YEAR.	1871. WEEK.	1871. YEAR
By Railway	23,446 02	499,177 13	23,371 03	58,778 09
" Canal	239 17	1,429 03	711 03	711 03
Total	23,685 19	503,606 16	24,082 06	59,489 12
Increase 1872		441,117 04		

Company Coals.

June, 1872.

	L.	Str.	Grs.	Eg.	Sto	Chest
*Scranton at E. Port	3 47	3 54	3 60	3 63	4 19	3 58
*Pittston at Newburg	3 30	3 99	4 00	4 10	4 25	4 00
*Lackawana at Weehawken	3 75	3 75	3 85	3 85	4 25	3 75
Wilk'b're at Hoboken	3 75	3 75	3 85	3 85	4 25	3 80
Old Co. Lehigh at PtJohn'n	5 15	—	4 35	4 35	4 60	4 60
Lehigh at Eliz. Port	5 00	—	4 25	4 25	4 50	4 00

For freights to different points see "Freights."

* To contractors only.

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

	AT NEW YORK, June 14. R. A.	W. A.	AT PHILADELPHIA, June 14. R. A.	W. A.
SCHUYLKILL.				
Lump	$— —	$— —	— —	
Steamer	— —	— —	— —	— —
Broken	— —	— —	— —	— —
Egg	5 25	4 75	— —	— —
Stove	5 50	5 00	— —	— —
Chestnut	4 25	— —	— —	— —
Pea	— —	— —	— —	— —
LEHIGH.				
Lump, (along side)	5 00	— —	— —	— —
Broken	4 75	— —	— —	— —
Egg	4 50	— —	— —	— —
Stove	5 25	— —	— —	— —
Chestnut	4 25	— —	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS.*				
Honey Brook, Le'h W. A.	4 00@4 75		— —	— —
Spring Mountain " "	— —@— —		— —	— —
Sugar Creek " "	— —@— —		— —	— —
Sugar Loaf " "	— —@— —		— —	— —
Old Comps'n " "	4 00@4 75		— —	— —
Room Run " "	4 00@4 75		— —	— —
McNeal " "	— —		— —	— —
Girardville " "	— —		— —	— —
Hill & Harris " "	— —		3 10@4 00	— —
Shamokin " "	— —		— —	— —
Lykens Valley " "	— —		— —	— —
Broad Top " "	— —		— —	— —
McMichael " "	— —		3 25@4 25	— —
Henry Clay " "	— —		— —	— —
Powelton " "	— —		— —	— —

Prices at Baltimore—June, 1872.

Wholesale Prices to Trade.

Wilksbarre, by cargo or car load	$4 60@4 85
Pittston and Plymouth, do	4 60
Shamokin Red or White Ash, do	4 75
Lykens Valley Red Ash, do	5 50
Zerba Valley	
Treverton	
By retail, all kinds per ton of 2,240 lbs	6 50@7 50
George's Creek and Cumberland f. o. b. at Locust Point for cargoes	4 60@4 65
Fairmont and Clarksburg gas f. o. b. at L. Point	6 00
BITUMINOUS COALS.	
Kittaning Coal Co.'s Phœnix Vein, f. o. b. at Phila	$
Lemon " " "	
Cumberland Vein Coal	
Consolidation Coal Co.'s on board N. Y.	
Maryland Coal Co " "	

Prices at Georgetown, D.C., and Alexandria, Va.

June, 1872.

George's Creek and Cumberland f. o. b. for shipping $ 4 75

Prices at Havre de Grace, Md.

June, 1872.

Wilkesbarre and other White Ash for Cargoes	$4 25@4 50
Lykens Valley	@5 50
Shamokin Red or White Ash	4 25@4 50

Bituminous Coals (Cumberland).

Georgetown, F.o.b	$4.25
Baltimore	4.50
New York	6.60

Prices of Gas Coals.

June, 1872.

PROVINCIAL.

Corrected weekly by Louis J. Bolloni, Jr., 41-43 Pine st., N. Y

	Coarse Slack.	
Block House	$1 60	@- 75
Gowrie	1 60	— 75

Vessels are being chartered at $3 00 to $3 25.

Corrected by Bird, Perkins & Job, 27 South street.

	Coarse.	Culm of Coal,
Pictou	$2 25	1 25
Sydney	2 25	- 80
Lingan	1 60	- 80
Little Glace Bay	1 60	1 00
Caledonia	1 60	- 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty on all slack coal or Culm : 40c. per ton of 28 bushels, 80 pounds to the bushel. On all bituminous coal or shale: 75 cents per ton of 28 bushel.

AMERICAN.

	Currency.	
Westmoreland	$7 10	@- —
Fairmount Gas Coal Co. of N. Y.	7 00	@- —
Despard Coal Co	7 00	@- —
Penn	7 10	@- —
Newburg Orrel Gas	— —	@- —
West Fairmount Gas Coal	7 00	@- —
AT PHILADELPHIA.		
Westmoreland	6 00	@- —

Foreign and Provincial Freights.

June 1872.

Foreign.

Newcastle and Ports on Tyne, per keel of 21 1-5 tons £

Liverpool, 5 per cent primage

TO NEW YORK.

Provincial.

Sidney	$3 00
Lingan	3 00
Cow Bay	3 25
Port Caledonia	3 25
Little Glace Bay	3 25
TO BOSTON.	
Sydney	2 90
Lingan	2 90
Cow Bay	3 00
Port Caledonia	2 90
Little Glace Bay	2 90

Prices of Foreign Coals.

June, 1872.

Duty $1 25 per ton.

Corrected weekly by ALFRED PARMELE, No. 32 Pine street, N. Y.

Liverpool Gas Caking	$ 8 00@— —
" " Cannel	12 00@13 00
" House "	19 00@20 00
" Orrel	11 00@16 00
Per ton 2,240 lbs., ex-ship.	
PRICES FROM YARD.	
Liverpool House Orrel, screened	$14 00@16 00
"Cannel, "	19 00@23 00
Per ton 2.000 lbs. delivered.	

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven for consumption ($1 85 less 55c drawback	$1 30
For reshipment	1 75

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Phillipsburgh	$0 66
C. R. R., N. J., Phillipsburgh to Elizabethport	0 98
Shipping expenses at Elizabethport	25
Wharfage	10
Total	$1 99

MAUCH CHUNK TO PORT JOHNSON.

L. V. R.R., or L. & S. R.R. from M. C. to Phillipsb'g	$0 66
C. R. R., of N. J., Phillipsburgh to Pt. Johnson	0 98
Shipping expenses	25
Wharfage	10
Total	$1 99

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Phillipsburgh	66
Morris & Essex R. R. Phillipsburgh to Hoboken	0 98
Shipping expenses	25
Wharfage	10
Total	$1 99

TO SOUTH AMBOY.

L. V. R. R.	66
B. & D. R. R.	98
Cam. & Am R. R.	
Shipping Expenses	35
Total	$ 199

PENN HAVEN TO ELIZABETHPORT.

L. V. R R. Penn Haven to Phillipsburgh	0 78
C. RR. of N. J. Phillipsburgh to Elizabethport	0 98
Shipping expenses	25
Wharfage	10
Total	$ 2 11

Freights.—June 14, 1872.

TO EASTERN PORTS.	Cumberland. From Georgetown.	Cumberland. From Baltimore.	Anthracite. From Philadelphia.	Anthracite. From Elizabethport, Port Johnson, and Hoboken.	Anthracite. From Rondout.	Anthracite. From Newburgh.
Amesbury	3 00					
Bangor	3 00	2 90		2 15	2 40	
Bath	2 90	2 75		2 15	2 45	2 25
Boston	2 35	2 40		1 00	1 20	1 15
Bridgeport	2 40			1 50	1 80	
Bristol	2 90					
Cohasset Narrows	3 00			1 25	1 25	
Derby	2 80					
Dighton				2 15		
East Cambridge				1 50	1 80	1 75
Fall River	2 40	2 60				
Hackensack				1 60	1 75	
Hartford	3 00	3 00		50		
Hoboken	2 10			50		
Jersey City	2 00			1 35	1 60	
Middletown						
Mystic				1 60		
New Bedford	2 70	2 75		2 50	2 55	
Newburyport	3 10	3 00		1 00	1 25	1 15
New Haven	2 35	2 40		1 30	1 55	1 45
New London	2 40	2 60		1 50	1 80	1 75
Newport	2 40			50		60
New York	2 20	1 90		1 00		1 15
Norwalk	2 40	2 50		1 35	1 60	1 55
Norwich	2 50	2 60		1 60	1 90	1 85
Pawtucket	2 75	2 75		2 00		
Portland	3 00	2 75		2 25	2 55	
Portsmouth, N.H	3 25	3 00		1 50	1 80	1 75
Providence	2 40	2 60				
Rockport				1 30		
Saco				2 20		
Sag Harbor	2 90	2 75		1 00		
Salem				1 30		1 15
Stamford				2 00		
Stonington				1 20		
Taunton						
Warren						
Washington						
TO RIVER PORTS						
Albany	75	2 40			25	
Catskill					50	
Cockaackie					40	
Coeyman's					65	
Cold Spring	2 30	2 25			20	
Fishkill					20	
Haverstraw	2 30				40	
Hudson	2 50	2 40			40	
New York						
Nyack					45	
Poughkeepsie	2 40				30	
Rhinebeck					30	
Rondout					30	
Saugerties					40	
Sing Sing					50	
Stuyvesant					55	
Tarrytown					50	
Troy	3 00	2 50			75	
West Point					20	
Yonkers					50	

MARKET REVIEW.

IRON—Scotch Pig has arrived freely, and, though a large portion of the receipts were sold previously, there is still sufficient additional supply to cause a feeling of weakness. Manufacturers are now well stocked, and prices are rather nominal at $47 @ $53 as to brand; 400 tons Glengarnock sold, supposed, at about $48, though $49 @ $50 is generally asked. Eglington may be quoted about $47 without sales. American Pig remains firm; the sales from first hands, however, are small at about $51 @ $52 for No. 1, $50 for No. 2, and $45 @ $46 for Gray Forge at furnace, and $48 on the spot. Some small lots of No. 1 Allentown sold at $51 cash. We understand that further repurchases of some 1500 tons Crane has been made from early buyers, but the terms we could not learn. New English Rails are quiet, and we hear of no sales; we quote them $72 @ $73, and old do. $49a50 gold. American are without change. We note sales of 3000 tons at $85; at the works we quote them $85a90. Scrap is very dull and nominal at $50 from dock, and $55a57,50 from store. Refined Bar from store, is dull at our quotations, which are unchanged. Russia Sheet is quoted 18½ cents gold.

PHILADELPHIA, June 10.—(From Circular of Edward Samuel.)—There has been more inquiry for Pig from buyers for forge grades for July and later deliveries, and consequently less disposition on the part of sellers to make concessions. In old Rails, some few sales at $49a

$50 gold, for future delivery—these figures are extremely low, as at present foreign prices it would be impossible to import under $51a52 gold. Manufactured Irons without change.

LEAD—Pig is very quiet, but stocks seem to be held firmly, and we repeat our former quotation of 6⅛ cents gold for ordinary Foreign, at which price a small lot of Spanish has been taken. Bar 9¼ cents, Sheet and Pipe 11, and Tin-lined pipe 15, less 10 ₱ cent. to the Trade.

COPPER—The prices of Manufactured Copper and Yellow Metal are unchanged, and we quote as before; New Sheathing Copper 43 cts., Bolts and Braziers 45, Bronze and Yellow Metal Sheathing 30, and Y. M. Bolts 32, net cash. Ingot remains very quiet, and we have only to notice small sales Lake at 33 cents: for future delivery 33a33½ is asked; the offerings both for present and forward delivery at these figures is light. English is not on the market at the prices now current; 50 tons have been reshipped since our last.

SPELTER—Foreign is still neglected, and prices are nominal at 7a7⅛ cents gold for Silesian domestic 11c. currency.

TIN—Pig remains very quiet, and prices of considerable parcels are still nominal; 250 slabs Straits sold on private terms. For small lots 37 cents gold has been paid. The last cable quotation from England is £153a154 for English, which is lower than before. Plates are in rather better demand, and the market has decidedly more tone than before. Coke Tin have become scarce, and are now held at $12 gold and upward; sales have been made of 500 bxs. Charcoal Tin at $13,15 for I. C.; 2000 do. I. C. Coke, 14 by 20, $11,75a12 gold: and 900 do. Charcoal Tin, 500 do. I. C. coke, and 500 do. Coke Terne on private terms.

BATAVIA, April 16.—The auction sale of 8035.73 piculs Billiton on 8th inst., resulted in an average of f.99.40 ₱ picul.

ZINC—Mosselman Sheet is dull, no recent sales having been made from agents' hands—30 casks sold from dealers hands, at 8¼ cents net gold. Oxide French 9c. gold, oxide American 10c. currency, manganese black oxide 3½c. currency.

METALS.

NEW YORK, June 13, 1872.

IRON.—Duty: Bars, 1 to 1¼ cents ₱ lb; Railroad, 70 cents ₱ 100 lbs.; Boiler and Plate, 1½ cents ₱ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ₱ lb; Pig, $7 ₱ ton; Polished Sheet, 3 cts. ₱ lb; Galvanized 2½; Scrap Cast, $6; Scrap Wrought, $8 per ton.

	Store Prices.
Pig, Scotch No. 1, ₱ ton	$47 00@53 00
Pig, American, No. 1	51 00@52 —
Pig, American, No. 2	50 00@51 —
Pig, American, Forge	47 00@48 00
Bar Refined, English and American	— —@115 00
Bar Swedes, assorted sizes (gold)	85 00@160 00
	Store Prices, Cash.
Bar, Swedes	125 00@135 00
Bar, Refined, ¾ to 2 in. rd. & sq. 1 to 6 in. x ¾ to 1 in.	110 00@— —
Bar, Refined, 1¾ to 6 by ⅛ & 5:16 & 2½ to 2½ rnd. sq.	115 00@— —
Bar, Refined, 1 & 1¼ by ¼ & 5:16	117 50@— —
Large Rounds	122 50@127 50
Scroll	122 50@152 50
Oval: and half-round	127 50@137 50
Band	— —@122 50
Horse Shoe	129 00@130 00
Rods, ¾ to 3-16 inch	115 00@155 00
Hoop	135 00@177 50
Nail rod	8 @— —
Sheet, Russia, as to assortment (gold)	— 49 18½
Sheet, Singles, D. and T. Common	—6½@— 7⅛
Sheet, D. and T. Charcoal	—7½@— 8½
Sheet, Galv'd, Nos. 10 to 27, list 10 per cent discount	—@— —
" " Nos. 28, and 29	—@— —
Rails, English (gold), ₱ ton	72 50@73 00
Rails, American, at Works in Pa	85 00@90 00

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 4 cents ₱ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ₱ lb	— @— 43
Copper Bolts	— @— 45
Copper Braziers, 16oz. and over	— @— 45
Copper Nails	— @— 45
Copper, Old Sheathing, &c. mixed lots	26 @— 28
Copper, Old, for chemical purposes, 14@16 oz.	— @— —
Copper English Pig	32½@— 33
Copper, American Ingot	33 @— —
Yellow Metal, New Sheathing & Bronze	— @— 30
Yellow Metal Bolts	— @— 32
Yellow Metal Nails	30 @— 32

LEAD.—Duty: Pig, $2 ₱ 100 lbs.; old Lead, 1¼ cents ₱ lb; Pipe and Sheet, 2¼ cents ₱ lb.

Galena, ₱ 100 lbs	$— — @— —
Spanish (gold)	— — @6 62½
German, do.	— — @6 62½
English do.	6 62½@7 12½
Bar (net)	8 75 @— —
Pipe (net)	— — @11 00
Sheet	— — @11 00

Colwell, Shaw & Willard Tin-Lined Lead Pipe 15 cts. ₱ lb.

STEEL.—Duty: Bars and ingots, valued at 7 cents ₱ lb or under, 2¼ cents; over 7 cents and not above 11, 3 cents ₱ lb; over 11 cents, 3½ cents ₱ lb, and 10 ₱ cent ad val. (Store prices.

English Cast (2d and 1st quality) ₱ lb	— 16½@— 18½
English Spring (2d and 1st quality)	— 7½@— 10½
English Blister (2d and 1st quality)	— 10½@— 17½
English Machinery	— 11½@— 13½
English German (2d and 1st quality)	— 10½@— 12
American Blister "Black Diamond"	— —@— 12
American, Cast, Tool do.	— 15 @— 16
American, Spring, do.	— 9 @— 11
American Machinery do.	— 10 @— 10½
American German, do.	— — @— 11

TIN.—Duty: Pig, Bars, and Blocks, 15 ₱ cent. ad val.; Plate and Sheets and Terne Plates, 25 ₱ cent.; Roofing 25, ad val.

	Gold ₱ lb.
Banca	50 @—
Straits	36½@37
English	36½@37

PLATES. Fair to Good Brands.	Gold.	Currency.
I. C. Charcoal, ₱ box	$13 25 @13 50	$15 00 @15 50
I.C. Coke	11 12½@12 00	13 75 @14 75
Coke Terne	10 50 @10 75	12 00 @15 00
Charcoal Terne	12 — @13 00	14 00 @12 50
SPELTER—Duty: In Pigs, Bars & Plates,		$1.50 p. 100 lb
Plates, Foreign (gold) p. 100 lb.		7 00 @ 7 12½
Plates, Domestic p lb.		— 8 @— 11

ZINC—Duty: Pig or Block, $1.50 per 100 lb.; Sheet 2½c. per ₱ Sheet ... per lb.— 10 —@ 10½

San Francisco Stock Market.

BY TELEGRAPH.

NEW YORK, June 13, 1872.

The following report from the San Francisco Stock Board is dated the 11th inst. With the exception of a slight decline in Savage, the list has materially advanced. The Trustees of the Imperial Mine have increased their stock from 4000 shares incorporated value of $500 per share to 100,000 shares of the par value of $100 per share, which increases the stock of the Company from $2,000,000 to $10,0000,000. The new issue is quoted at $7 per share, which is an advance of about 25 per cent compared with our last quotations on the old basis. Raymond and Ely has declared a dividend of $7 per share payable June 10, that our readers may see the course of the market we have appended the report of the 6th inst.

		June 6.	June 11.
Savage	—	170	140
Crown Point	New Issue	128	128
Yellow Jacket	—	120	115
Kentuck	—	170	—
Cholar Potosi	—	100	109
Gould & Curry	—	175	155
Belcher	—	860	820
Imperial	New Issue	8½	7
Hale & Norcross	—	—	—
Eureka G. V.	—	—	—
Ophir	—	—	—
Alpha	—	—	—
Raymond & Ely	—	—	—
Amador	—	—	—

Mining Stocks.

We have not much of interest to note with regard to Mining Stocks, the following report of this mornings session of the Board does not exhibit any material changes compared with our last. The sales have been confined to a few transfers of Grass Valley at from 10 to 11 cents, about 700 shares of La Crosse also changed hands at from 70 to 72 cents per share. Rutland marble is quoted at $27. Adams Express is put on the market at $99 per share. Walkill assent "Lead" is quoted at 5 cents per share.

	BID.	ASKED.
American Flag	30	40
Bates & Baxter	45	—
Benton	6	7
Black Hawk	80	1 25
Cisco Gold	—	—
Central Gold	7	11
Cons Gregory	40	55
Grass Valley	10	12
Gunsell	1 00	1,75
Holman	—	—
La Crosse	70	72
Liberty	3	4
Montana	—	—
Rocky Mount	5	15
Quartz Hill	30	40
Smith & Farm	—	40
Texas	—	—
New York and Eldorado	—	—

BLAST FURNACES
FOR LEASE
AT MOUNT SAVAGE, MARYLAND.

The UNION MINING COMPANY, Proprietors of the old MOUNT SAVAGE IRON CO., offer for lease their Blast Furnaces (two) of 13 and 16 feet bosh respectively, capable of producing 300 tons per week. The situation of these Furnaces in the heart of a country offering coal and limestone of the best quality at the lowest cost, and within short and cheap reach by railway connection of the ore-beds of Pennsylvania, presents to capitalists a favorable opportunity for investment. Within a few weeks a thorough connection by rail between the Furnaces and Philadelphia and New York will be completed. For terms apply to

JAMES S. MACKIE, President.,
71 Broadway, New York.
or JAMES A. MULLHOLLAND, Vice President,
Mount Savage, Maryland.

TO OWNERS OF MINES.

The "St. Louis Smelting and Refining Co.,"

will commence operations on the 1st of July, when they will be prepared to smelt ores of Silver and Gold, or refine Base Bullion, on commission or to purchase the same. Correspondence is solicited from all parties having these materials for sale or reduction, stating the character of the ore and the amount which may be depended on for regular supply, whenever such parties propose to furnish material regularly.

Address; J. H. HOWARD, Gen'l Sup't,
june 4-2m 515 Chestnut street, St. Louis, Mo.

OXIDE MANGANESE, BEST AND HIGHEST test for Steel and Glass Makers' use. For sale by the Importers,

L. & J. W. FEUCHTWANGER,
55 Cedar street N. Y.

MISCELLANEOUS.

R. P. ROTHWELL,
MINING AND CIVIL ENGINEER
AND METALLURGIST,
From the Imperial School of Mines, Paris, member of the Geological Society of France, etc,
OFFICE, WILKESBARRE, PA.
Having had a large practical experience in Europe and this country, is prepared to examine and report on all kinds of mineral property, superintend mines, and metallurgical works, assay ores, etc.

THOMAS M. DROWN,
CHEMIST AND METALLURGIST,
209 South Sixth Street,
PHILADELPHIA.
Analyses of Ores, Coals, Smelting Products, etc. Examinations of Metallurgical Processes. Instruction in Analytical Chemistry. d5:6mo

DR. ISIDOR WALZ,
ANALYTICAL and CONSULTING CHEMIST
No. 18 EXCHANGE PLACE.

ADOLPH OTT,
CHEMICAL ENGINEER,
May be employed professionally as an expert on practical subjects, involving both Chemical and Mechanical knowledge. specialist in various branches of Technology. Assays and Analyses of all kinds. Address, 119 East Twelfth street, New York City.
☞ Written communications preferred. nov28-tf

WILLIAM F. McNAMARA,
SOLICITOR OF PATENTS
AND COUNSELLOR-AT-LAW,
No. 37 PARK ROW, NEW YORK, ROOM 22.
Advice in Patent Law given free. mar 8:tf

P. H. VAN DER WEYDE, M. D.,
(Late Professor of the N. Y. Medical College, of Mechanics, etc., at the Cooper Institute, and of Industrial Science at the Girard College, Philadelphia.)
Analytical & Consulting Chemist and Engineer
236 Duffield street, Brooklyn.
Office MANUFACTURER AND BUILDER, 37 Park Row, New York City.

NEW PATENT AGENCY.—
JAMES A. WHITNEY, ₱
SOLICITOR OF PATENTS. EXPERT AND ENGINEER,
Offers his services in securing American and Foreign Patents, as Expert in Patent suits, in conducting searches in English, French and American Industrial and Scientific records, in examining and reporting upon the utility of inventions, the designing of apparatus for technical purposes, etc., etc. For full information address JAMES A. WHITNEY, 128 Broadway, room 11, New York City. June 4:tf

MAYNARD & VAN RENSSELAER,
Mining and Metallurgical Engineers,
Experts in Iron, Analytical Chemists,
24 Cliff Street, New York.
GEO. W. MAYNARD, ECHUYLER VAN RENSSELAER.

High Prices and Quick Returns
FOR
GOLD AND SILVER ORES.

The Royal Prussian Smelting Works of Clausthal, the Harz generally, the Association of Eisleben, and the Royal Saxon Smelting Works of Freiberg, have appointed as their Agent R. J. ROBERTSON, METAL-DEALER IN HAMBURG, GERMANY, who is now ready to buy for the above works all kinds of
Gold and Silver Ores, Regulus and Base Bullion.
Payment made according to a regular tariff, agreed upon by all the works referred to. No commission charged to sellers.
For particulars address
H. ROBERTSON,
53 Ferry Street,
New York City

The New York Society of Practical Engineering.

At the May meeting of the New York Society of Practical Engineering papers were presented by Mr. LE HARDY DE BEAULIEU upon the subject of type setting machines, and by Mr. H. L. BREVOORT upon the steam engine indicator. The machine especially noticed in the first paper is the invention of Mr. DELCAMBRE, a French gentleman. The type boxes deliver the type to the "stick" along inclined grooves, gravity being the propelling force. Hand labor is employed for "justifying" the matter, as is usual in such cases. When the enormous sums paid by the New York daily press for composition, often amounting to from one to two hundred thousand dollars annually, are taken into consideration, the value of a machine which will materially reduce both time and labor will not be over-estimated.

Mr. BREVOORT, in speaking of the indicator, classed it among those inventions which do not supersede machines now in use, but aid in gaining a correct knowledge of the manner in which the machines perform their work, whether well or ill. After alluding to the value of the indicator from its first introduction by WATT, when applied to the low pressure engine with the slow piston speed of those times, mention was made of the utter uselessness of such an instrument when applied to the modern high pressure engine with its enormous piston speed, sometimes reaching a thousand feet per minute. To meet the requirements of the modern engine the RICHARD's indicator, in which piston motion is shortened twenty-five per cent., and the spring itself in a similar ratio, seems all that can be desired. Through the wasteful use of steam in the engine, the loss arising in coal burned without useful effect in large engines not unfrequently amounts to a sum more than sufficient to pay, not only for the indicator itself, but for the time and labor involved in its frequent use and in working up the necessary calculations connected with its employment. This instrument has the greatest value in determining whether valves of engines are correctly set, which is of great importance, since a valve which, when cold, may seem adjusted with the utmost delicacy, may, when heated by the steam, be sufficiently thrown out of position to cause a serious waste in working the engine. It is only within a few years that instruments of American manufacture have been equal to those made abroad. Recent improvements in the attachment of the spring giving greater reliability under wide variations of pressure, have given instruments of domestic manufacture a decided superiority. In the former constructions the brass ends of the spring, which were circular, were fastened in a slot cut all the way round. After proper adjustment they were secured in place by pouring in white metal. When under considerable pressure, one coil was liable to rest upon another and seriously impair the accuracy of the indication. The new arrangement by which this is remedied is to make the brass ends of the springs with lugs containing horizontal slots, finished so that the spring is supported at two points only, leaving it free to act uniformly in all positions. Indicator springs require frequent testing, even if they have had perfect adjustment in the instrument. These tests should be made at temperatures equal to those at which they are expected to be employed in testing engines.

The usual indicator piston, consisting essentially of a short tube closed by a diaphragm at the top and open below, has received a most satisfactory modification in the beveling of the lower edge so as to leave a feather edge in contact with the cylinder. The bevel is all from the inside. The only requisite is that the feather edge shall not be so thin as to be unduly expanded against the cylinder when the steam presses against the interior of the piston. Two grooves—semicircular in section—are turned upon the outside of the piston. Another modification of the piston is to prolong the tube from which it is made somewhat and place the diaphragm across near the middle, forming a section somewhat like an H, the attachment being in that case made from the diaphragm as usual. This construction would be especially valuable in preventing leakage in case of a partial vacuum below the piston. The most convenient methods of taking cards, the usefulness of reducing wheels, together with various suggested adjuncts of the indicator were taken up and discussed at some length by the writer.

Colorado Ores and Veins.

TO THE EDITOR—SIR: In your issues of April 2d, 9th and 23d, I find articles from "V. W." concerning the character of Colorado lodes and ores in general, and those of the vicinity of Georgetown especially.

Among the facts and figures, given mainly in the second article, of April 9th, I find only two great truths, which I readily indorse. There are several, probably about a dozen, lodes around Georgetown, which, if properly and vigorously worked, can now, or in a comparatively short time, produce large quantities of ore, a great portion of which may, by simple hand-dressing and sorting, furnish good smelting ore, with from 50 to 65 per cent. of lead, and (leaving the Maine and Stevens lodes out of consideration) 15 to 30 oz. of silver to the ton. It is also true that these ores can be profitably beneficiated by the smelting process only; that there can be and there will be enough taken out to keep works of pretty large capacity fully supplied; and that the erection of such works would be a lucrative investment, especially after the completion of the railroad to Georgetown. The rest of the articles referred to, I must pronounce exaggerated, or utterly mistaken, if my own six years' experience as a mining engineer in that part of Colorado enables me to judge.

1. I have, so far, never seen any ores in Colorado which it would pay to work for antimony and arsenic, and I cannot conceive what kind of ores "V. W." refers to, or where they are found.

2. It is not true that in Colorado at present galena ores can be mined with profit for lead alone, and it will not become true as long as the present rates for labor and materials remain.

3. It is not true that galena veins (by which term I understand veins, in the composition of which galena takes a prominent place) constitute the great majority around Georgetown; nor that *many* of them are of wonderful richness; nor that "a foot of galena is almost a common occurrence in Georgetown lodes."

4. It is not true that there is "one or two feet of mineral at the surface" on the Bush and Mendota lodes; neither I nor anybody I have asked has seen it. Where the Mendota lode was struck in Burleigh's tunnel, it was about eight feet wide, but the ore vein was only two feet, and that mostly zinc blende, as "V. W." may see by examining the pile of ore from that vein in front of the tunnel.

5. It would be difficult to name the "many" other lodes outside of the Gilpin, Henry Ward Beecher, New Boston, Bush and Mendota, which contain "as large bodies of galena," assaying 50 to 60 per cent. of lead, and carrying silver enough to cover every expense of mining and milling; it may fairly be questioned whether such was the fact in the above-enumerated lodes.

6. It is not true that thousands of tons of lead are lost every year because the reduction works do not save them. If "V. W." will take the trouble to inquire, he can easily ascertain that the amount of ore treated in all the amalgamating works during the fiscal year 1871-1872 was considerably less than 2,500 tons; and this ore contained on an average less than 5 per cent. of lead. Nor do I believe that in one week 75 tons of the finest lead ore, with 50 per cent. of lead and 250 ounces of silver were taken out by running a drift on the Maine lode (the only one to which "V. W.'s" statement to this effect can possibly refer).

7. It is not true that there are silver lodes in Colorado in which the "gangue consists of the best copper ore, and in considerable quantity." As to the fair per centage of copper, the lodes on McClellan Mountain would yield, if they continue as they have been, I can assure "V. W." from extensive personal knowledge of those lodes, that he would not get one-half per cent. Did he, perhaps, wear green or blue spectacles when he visited that locality? Equally apocryphal are the veins in Colorado, of which antimony is a large constituent. Has V. W. "ever seen decomposed galena or zinc?"

8. The coal from Southern Colorado has not been successfully coked to my knowledge.

9. The statement (April 23) that nine-tenths of all the lodes in Clear Creek County carry 50 per cent. of galena, and that it is a prominent factor in all, is ridiculous; and the statement that few lodes have pay rock at the surface, unless they are covered by deep slides, or are in a favorable position for shedding water, is based upon a very limited number of phenomena, and does not hold good for Clear Creek County.

10. Has "V. W." ever seen chloride of copper, and, if so, in which of the Colorado silver lodes?

A. W.

[The statement in the second paragraph of the article of "V. W.," entitled "The Base Metals of Colorado," to the effect that "in some cases the greater part of the gangue is tin or copper ore" has been commented on by the Colorado *Miner*. As the succeeding sentence of that article shows, it is *zinc*, not *tin*, which is referred to; and the error was a slip of the pen or of the types. The sense in which this correspondent uses the word "gangue," to mean the ores accompanying or containing gold and silver, is questionable. We think the term should be confined to the non-metalliferous vein matter.—ED.]

Railway Signals.

The following communication, which appeared in the Boston *Advertiser* of June 6, explains itself:

"There are in the United states several millions of persons, sick and well, living along the lines of the various railroads, and near manufacturing establishments in populous towns, who are disturbed day and night by the discordant shrieks of the modern steam whistle. Owing to the gradual introduction of this apparatus, the public has learned to tolerate it, but we venture to assert that if it could have been introduced suddenly as we hear it to-day, no community would have consented to its use. These unearthly sounds are made in manufactories at early dawn, at noon and at night, to call their operatives to work, and to meals; and on the railroads to warn passengers on the highways, and to give notice to switch-tenders on the approach of trains. It is not necessary to describe them, since they are familiar to all, and all are more or less affected by them. Is there no remedy for this increasing evil? or cannot a substitute be found which will answer all the purposes of the steam whistle, without annoyance to the public, and with safety to travellers on the railroad and on the highway? Believing that such a substitute can be found, and to encourage experiments in that direction, we hereby agree to pay the sum of ten thousand ($10,000) dollars to any one who shall, within two years from January 1, 1873, invent a system of signals which shall supplant the use of steam whistles on railroads, and which shall be pronounced by judges, hereinafter named, to be free from the evils of the present system, and which shall be attended with no discomfort to passengers on the trains, or the highways, or to residents along the line of the railroads. One-fifth of the amount thus pledged shall be paid to the author of such invention at any time within the period specified, whenever its claims shall be substantiated by the said judges, and the ballance whenever the invention shall be adopted and used by a majority of the railroad companies in New England, provided such adoption be previous to January 1, 1877. The judges in these premises shall be the chairman of the Massachusetts board of railroad commissioners, the president of the Boston and Albany and Boston and Maine railroad corporations, the professor of civil engineering in the Massachusetts Institute of Technology, and the chief engineer on the Boston and Albany Railroad. If any of the above named gentlemen shall decline to serve as judges, the donors reserve to themselves the right of naming substitutes."

Communications may be addressed to "Committee on Railroad Improvements," care of Boston Daily *Advertiser*, Boston, Mass.

THE ENGINEERING AND MINING JOURNAL.

ROSSITER W. RAYMOND, Ph. D., Editor.

PUBLISHERS' ANNOUNCEMENT.

THE ENGINEERING AND MINING JOURNAL *is projected in the intent of furthering the best interests of the Engineering and Mining public, by giving wide circulation to original special contributions from the pens of the ablest men in the professions. The careful illustration of new machinery and engineering structures, together with a summary of mining news and market reports, will form a prominent feature of the publication.* It is the Organ of the American Institute of Mining Engineers, and is regularly received and read *by all the members and associates* of that large and powerful society, *the only one of the kind in this country.* It is therefore the best medium for advertising all kinds of machinery, tools and materials used by engineers or their employees.

SUBSCRIPTION—**$4** *per annum in advance;* **$2 50** *for six Months.*

ADVERTISEMENTS—*The rates are as follows: Inside pages,* **25** *cents per line each insertion; the outside or last page,* **40** *cents per line. Payment required in advance.*

NEWSDEALERS *will be supplied through the agency of the* AMERICAN NEWS COMPANY, *No.* 121 *Nassau street, New York City.*

COMMUNICATIONS *of all kinds should be addressed to the Manager. The safest method of transmitting money is by checks or Post-office orders, made payable to the order of* WILLIAM VENTZ, *Correspondence and general communications of a character suited to the objects of* THE ENGINEERING AND MINING JOURNAL *will always be welcome.*

The Postage on THE ENGINEERING AND MINING JOURNAL *is twenty cents a year, payable quarterly in advance, at the office where received.*

THE SCIENTIFIC PUBLISHING CO.

WILLIAM VENTZ, SECRETARY.

27 Park Place,

P. O. Box 4101. NEW YORK CITY

CONTENTS FOR THIS WEEK.

Improved Coal Barges	385
Engineering and Mechanical Notes	385
Iron Making in Rhode Island	386
Concerning Machine Belting	386
Malleable Cast Iron	386
Steam Tillage	387
The Copper Mines of Chili	387
THE COAL TRADE	389
THE MARKET REVIEW	390
Advertisements	391
The New York Society of Practical Engineering	392
Colorado Ores and Veins	392
Railway Signals	392
EDITORIALS:	
Sartor Resartus, or the Corrector Corrected	393
The Emma Mine	393
The Sutro Tunnel	393
The Recent Meeting of the Institute	394
About Town Jottings	394
The Origin of Metalliferous Deposits	394
American Institute of Mining Engineers	395
MINING SUMMARY:	
Increase of Mining Stock Capital	395
Nevada	395
Colorado	396
Advertisements	397

The Cave at the Emma.

Since the article in our present number on the Emma Mine was sent to the printer, news has come to hand of a cave in the mine, which will doubtless put a stop for some time to the shipments of ore. It is reported that the melting of the vast body of snow in Little Cottonwood cañon brought down the hanging wall, in spite of the elaborate timbering, on the Comstock plan, with which the excavation was filled. This system was not well suited to resist great lateral pressure, and the size of the empty space was fearfully large for such precarious ground. The men all escaped without injury; even the mule was led out in safety. A telegram to the New York papers says the company is sinking a new shaft outside of its patented ground—which has an ugly litigious sound.

Sartor Resartus, or the Corrector Corrected.

Our correction, last week, of the report of Professor Maynard's remarks on Siliceous iron, during one of the sessions of the Institute, needs to be still further doctored. He did not say "Ringwood;" and he did say "Durham;" and we hope he is satisfied with the abject apology which we herewith tender him. At any rate he will not get any more.

The Emma Mine.

Two respectable New York journals, the *Evening Post* and the *Nation*, have seized upon a circular which recently appeared in London, assailing the Emma Company, and made it the text for remarks upon the whole affair as a swindle. The former journal has since retracted its statements; the comments of the latter were mainly directed at Gen. SCHENCK'S former connection with the scheme; and though, in common justice, it also should apologize for its sweeping condemnation upon false evidence concerning a matter of which it was absolutely ignorant, to the political part of its criticism it will doubtless still adhere. Indeed, the *Nation* only weakens its original censure of the American minister (in which we cordially joined) by attempting to prove that the enterprise to which he lent his name was a swindle. That was not the point of his misdemeanor; if it had been so, he would now be perfectly justified by the continued success of the company, and the high market price of its stock, which, in spite of the circular, finds ready sale at a considerable advance over the rates at which it was first introduced. But there is not an atom of excuse for General SCHENCK in this fact; and hence there would be no extra blame for him (unless his complicity could have been shown to be corrupt) in the disappointment of expectations concerning the Emma mine.

At the time of the sale of the mine, we observed, and we here repeat the observation, that the price received for it was too large, and that it was not justified by the appearance of the mine in August, 1871, when we examined it personally. Developments made since that date have undoubtedly changed to a considerable extent the aspect of affairs; and we do not doubt (though here we must rely upon other evidence than our own senses) that the ore-deposit has been found to be far more extensive and valuable than it then seemed to be. Professor SILLIMAN'S remarks at the recent meeting of the Institute of Mining Engineers showed the nature and importance of the new discoveries.

The circular issued in London was the production of a person who held but one share of stock, and who appeared as an "ugly questioner" at the special meeting of the stockholders, reported voluminously in the London *Mining World* of May 11. His interpellations on that occasion were so promptly and thoroughly answered as to silence him at once. The only basis for such falsehoods as the circular promulgates is afforded by the snow blockade on the railroad, which for two months prevented the shipments of ores, and the impassable condition of Little Cottonwood cañon, which will probably continue to hinder shipments until the end of this month. No doubt the brilliant hopes and prophecies, based (as such estimates always are) on the steady working of all parts of the enterprise, have failed of complete fulfillment; but the fact remains that the mine has been steadily producing ore, is now doing so, and will continue to do so. Even the old reserves (to say nothing of the new discoveries) would insure this much. Those who feared the exhaustion of the deposit (before any proofs of its greater extent had been found) did not fear it so soon as this; and now nobody seems to fear it. The value of the new reserves opened in April is reported at one million dollars.

The New York shipping agent reports that the amount of ores shipped since the sale, up to about May 29, is 3,600 tons. The company has paid seven dividends, amounting to £105,000, or about half a million dollars, and now holds cash in hand and ores *in transitu* for six months' dividends in advance, at the same rate (18 per cent. annually). The shareholders who bought their stock seven months ago at £20 per share, have received already £2 2s. in dividends on each share, and can sell it again now at £30, may be pardoned for feeling that the "swindle" to which they have submitted is not so wholly "unmitigated" as the papers have declared!

The fact is, that it is no easy matter to determine the exact value of a mine when a large part of it is prospective. The vendors of the Emma were able to show tangibly about $2,500,000 of present value on the property which they sold at twice that rate. The rest they trusted to the luck of the future. We thought at the time that the risk was made unwarrantably great. We do not even now feel like approving the course of the company in capitalizing its property at so high a figure. Half the amount would be more certain to recoup itself in five years, as mining capital ought to do. But the Emma, instead of being one of the most objectionable of American mining schemes, is one of the least so. It is seldom that so large a proportion of the price of a mine, as 50 per cent., is represented by actual known value. By the side of such enterprises as the Utah Mining and Smelting Company, recently sketched in our columns, the sale of the Emma is a perfectly fair bargain.

Professor SILLIMAN and Mr. BRYDGES WILLYAMS, who examined the mine for the company, have come in for their share of abuse. The suggestion that either of these gentlemen was a party to any deception in the case is groundless and malicious. We have read the reports of Professor SILLIMAN on this property; and, to speak frankly, we do not agree with some things which we find in them; but we have never suspected him of intentional exaggeration or misrepresentation of the facts. Mr. WILLYAMS is at the head of the English smelting works, at which most of the Emma ores have been reduced. He is a member of Parliament, a man of large wealth, a stockholder and a director in the Emma Company, and certainly not the person to conspire to deceive others. It was announced at the meeting in London that Mr. WILLYAMS, after seeing the mine in February or March, ordered the purchase of additional stock for his own account at the ruling high rates.

We are not noted for reticence when free criticism is called for; and we do not by any means purpose to refrain from such remarks on the affairs of this or any other company as the public interest requires and truth warrants. But this stock-jobbing assault on the Emma, and the ease with which two ordinarily cautious journals fell into the trap of its deceit, seemed to us to require a full statement of the facts. The truth is that there is no immediate danger to this company from the exhaustion of its ores. We hear rumors of coming trouble with regard to title. All persons acquainted with the history of the company know that the "Walker party" shuffled off litigation and got the United States patent for the mine by a very clever stratagem, for which Mr. TRENOR PARK has, justly or unjustly, received the credit. But that was a case of diamond cut diamond; and we have no sympathy with the defeated party. *For all the ground covered by the survey and patent,* the Company's title is, we think, perfectly secure. Whether that includes all the ground they wish to work in is another question, which must be settled by time and perhaps by fighting.

The Sutro Tunnel.

We have received from Mr. SUTRO a volume containing the report of the United States Commission on the Sutro Tunnel, the evidence taken on both sides before the Sub-Committee on Mines and Mining, in Washington, and the final arguments before the full committee, by Mr. SUNDERLAND against the proposed bill for the aid of the tunnel, and by Mr. SUTRO in its favor.

It is evident that the latter gentleman has come out of the investigation with more glory than his opponent. The committee has reported entirely in his favor, recommending the passage of a bill to assist the prosecution of the work by a Government loan to it, under certain restrictions and conditions. Of course, it was too late to expect any action on the subject at the recent session of Congress; but Mr. SUTRO'S chances may be set down as considerably improved.

We need not explain at length our own position in the matter. The simple engineering question of the

advantage of such a tunnel, which we would answer in the affirmative, is complicated with questions of law, contracts, royalties, vested rights, commercial interests, etc., which we cannot presume to answer without an examination at present out of our power. One thing seems clear to us; that the case is exceptional, and that if this tunnel, on account of the magnitude of the interest involved, is in any way assisted by Government, the step should not be made a precedent.

Meanwhile the Sutro Tunnel Company is going ahead with considerable energy. On the 31st of May the length of the tunnel was 2,902 feet, and the depth of the shafts as follows: No. 1 200 feet; No. 2, 483 feet; No. 3, 253 feet; No. 4, 245 feet. Progress in the shafts is still slow, the heavy hoisting and pumping machinery not being yet in position.

The Recent Meeting of the Institute.

WE finished in our last number the detailed report of the proceedings and debates of the Institute meeting, and in the present number we continue the publication of the papers read. Dr. HUNT's interesting and able address on the Origin of Metalliferous Deposits, though delivered before the Polytechnic Association immediately after the adjournment of the Institute, may almost be considered, from its nature and value, as a part of the regular transactions. Mr. TERHUNE's brief but suggestive paper on Malleable Cast Iron will be remembered as giving rise to a lively and profitable discussion.

We have omitted hitherto to render justice to the social features of the meeting. We refer to the receptions and excursions participated in by the members. Not possessing the fluent pen or the phosphorescent brain of a "JENKINS," we feel unable to describe with adequate compliment the delightful evening at Mr. HEWITT's house, where the brilliancy of the GEISSLER tubes and the oxy-hydric light was matched by the flashes of genius and the glow of cordial hospitality; where music and laughter lightly fringed the edges of more weighty discourse, or sweetly blended with the duties of supper. We lack, indeed, not merely the power of JENKINS, but his material, as well; for, aside from the fair hostess and the friends who supported her in the reception of her guests, there were no ladies present. Now, we couldn't be expected to describe with poetic enthusiasm the toilettes of the gentlemen. Of course, it never would do to dwell upon the snowy vest, immaculate tie, faultless gloves, finely-divided back hair and coat-tail of the peerless P. of Dunbar, and then go through precisely the same category for the manly M., late of Troy. So we borrow a phrase from the author whom we cannot emulate, and declare that where all were charming, it would be invidious to make distinctions.

The excursion to Hoboken was in every respect delightful. The display of the building and apparatus of the Stevens' Institute of Technology surprised everybody who had not already learned by personal examination how magnificently provided in these respects is that new institution. Almost equally surprising was the beauty of the residence and grounds of Mrs. STEVENS, at Castle Point, where the guests subsequently gathered for an entertainment provided with lavish hospitality. One would scarcely believe that so grand a site for a residence, commanding such splendor of prospect on every side, exists almost in the metropolis itself. In fact, there is but one, and well has it been improved.

A number of the members, under the guidance of Mr. COLLINGWOOD, made the dread descent into the New York Caisson of the Brooklyn Bridge. They do not speak with special enthusiasm of the particulars, the utmost report that we are able to get for our columns of this excursion being the declaration that they were glad they had been there, which sounds ambignous.

The excursion to Hallett's Point was thoroughly interesting and profitable. The members evidently appreciated this opportunity, since, contrary to our apprehensions (the meeting having finally adjourned on Thursday night), they turned out on Friday for the excursion in strong force. At Hallett's Point they had the pleasure of meeting General NEWTON, the officer in charge of the work, and also, by a fortunate coincidence, General HUMPHREYS, Chief of the U. S. Engineers, and Professor PEIRCE, Superintendent of the Coast Survey. After a thorough examination of the works above and underground, and of the drawings and model, which, with General NEWTON's clear explanations, conveyed a complete comprehension of the plan in progress, the party bid the Point farewell, and returned to New York, whence they scattered on their several ways, not to be assembled until the October meeting at Pittsburg, which may it be at least half as good as this one, and may we be there to see!

About-Town Jottings.

BUSINESS AND PERSONAL.

Personal announcements and business notices inserted in this column, at fifty cents per line.

Root's Wrought Iron Sectional Boiler, manufactured by the Root Steam Engine Co., 500 to 510 Second Avenue, New York

Utica Steam Engine Co. (formerly Wood & Mann Steam Engine Co.,) 42 Cortlandt street, N. Y.

Post & Goddard have removed to No. 111 Liberty street. Dealers in Taps, Dies, Reamers, Drills and supplies generally.

American Submerged Pump. Power attachment—cheapest and best in the market, 55 Chambers street, N. Y.

Roper Caloric or Hot Air Engine, 124 Chambers St.

Blake Bros., New Haven, Conn., manufacture Stone Breaker for crushing ores and minerals of every kind into small fragments, preparatory to their further comminution by other machinery.

The Niagara Steam Pump Works, 23 Adams street, Brooklyn, N. Y., are now working to their fullest capacity.

The Origin of Metalliferous Deposits.*

BY T. STERRY HUNT, F. R. S.

THERE are some fifty or sixty bodies which chemists call elements, the simplest forms of matter which they have been able to extract from the rocky crust of our earth, its waters and its atmosphere. These substances are distributed in very unequal quantities, and in very different manners. As regards the frequency of these elements in nature, neglecting for the present those which constitute air and water, and confining ourselves to the solid matters of the earth's crust, there are a few which are exceedingly abundant, making up nine-tenths, if not ninety-five-hundredths, of the rocks so far as known to us. The bases of which silica, alumina, lime, magnesia, potash and soda are oxyds, are very common, and occur almost everywhere. There are, however, other elements which are much rarer, being found in comparatively small quantities. Many of these rarer elements are, however, of great importance in the economy of nature. Such are the common metals and the substances used in the arts, which occur in nature in quantities relatively very minute, but which have been collected by various agencies, and thus made available for the wants of man. It is chiefly of the well known metals, iron, copper, silver and gold that I propose to speak to-night, but there are two other elements, not classed among the metals, which I shall notice for the reason that their history is extremely important, and will, moreover, enable us to comprehend more clearly some points in that of the metals themselves. I speak of phosphorus and iodine.

You all know the essential part which the former of these, combined as phosphate of lime, plays in the animal economy in the formation of bones, and how plants require for their proper growth and development a certain amount of phosphorus. Ordinary soils contain only a few thousandths of this element, yet there are agencies at work in nature which gather this diffused phosphorus together in beds of mineral phosphates and in veins of crystalline apatite, which are now sought to enrich impoverished soils. Iodine, an element of great value in medicine and in the art of photography, is widely distributed, but still rarer than phosphorus, yet it abounds in certain mineral-waters, and is, moreover, accumulated in marine plants. These extract it from the waters of the sea, where iodine exists in such minute quantities as almost to elude our chemical tests.

There are probably no perfect separations in nature. We cannot, without great precautions, get any chemical element in a state of absolute purity, and we have reason to believe that even the rarest elements are everywhere diffused in infinitessimal quantities. The spectroscope, which we have lately learned to apply to the investigation alike of the chemistry of our own earth, and that of other worlds, once supposed to be beyond the chemist's ken, not only demonstrates the very wide diffusion of various chemical elements here on earth, but shows us that very many of them exist in the sun. If we accept, as most of us are now inclined to do, the nebular hypothesis, and admit that our earth was once, like the sun of to-day, an intensely heated vaporous mass, that it is, in fact, a cooled and condensed portion of that once great nebula of which the sun is also a part—we might expect to find all the elements now discovered in the sun distributed throughout this consolidated globe. We may speculate about the condensation of some of these before others, and their consequent accumulation in the inner parts of the earth, but the fact that we have all the elements of the solar envelope (together with many more) in the exterior portions of our planet shows that there was, at least, but a very partial concentration and separation of these elements during the period of cooling and condensation. The superficial crust of the earth from which all the rocks and minerals which we know, have been generated, must have contained diffused through it from the earliest time, all the elements which we now meet with in our study of the earth, whether still diffused, or accumulated, as we often find the rarer elements, in particular veins or beds.

The question now before us is how have these elements thus been brought together, and why is it that they are not all still widely and universally diffused? Why are the compounds of iron in beds by themselves, copper, silver and gold gathered together in veins, and iodine concentrated in a few ores and certain mineral waters? That we may the better discern the direction in which we are to look for the solution of this problem, let us premise that all of these elements, in some of their combinations, are more or less soluble in water. There are in fact no such things in nature as absolutely insoluble bodies, but all, under certain conditions, are capable of being taken up by water, and again deposited from it. The alchemists sought in vain for a universal solvent, but we now know that water, aided in some cases by heat, pressure and the presence of certain widely distributed substances such as carbonic acid and alkaline carbonates, and sulphides, will dissolve the most insoluble bodies; so that it may after all be looked upon as the long sought for alkahest or universal menstruum.

Let us now compare the waters of rivers, seas and subterranean springs, thus impregnated with various chemical elements, with the blood which circulates through our own bodies. The analysis of the blood shows it to contain albuminoids which go to form muscle, fat for the adipose tissues, phosphate of lime for the bones, fluorids for the enamel of the teeth, sulphur which enters largely into the composition of the hair and nails, soda which accumulates in the bile, and potash, which abounds in the flesh-fluid. All of these are dissolved in the blood, and the great problem for the chemical physiologist is to determine how the living organism gathers them from the complex fluid, depositing them here and there, and giving to each part its

* An address before the Polytechnic Association of the American Institute, New York, May 24, 1872.

proper material. This selection is generally ascribed to a certain vital force, peculiar to the living body. I shall not here discuss the vexed question of the nature of the force which determines the assimilation from the blood of these various matters for the needs of the animal organism, farther than to say that modern investigations tend to show that it is only a subtler kind of chemistry, and that the study of the nature and relation of colloids and crystalloids, and of the phenomena of chemical diffusion, promises to subordinate all these obscure physiological processes to chemical and physical laws.

Let us now see how far the comparison which we have made between the earth and an animal organism will help us to understand the problem of the distribution of minerals in nature; how far water, the universal solvent, acting in accordance with known chemical and physical laws, will cause the separation of the mixed elements of the earth's crust, and their accumulation in veins and beds in the rocks. The subject is one of great importance to the geologist, who has to consider the genesis of the various rocks and ore-deposits, and the relations, which we are only beginning to understand, between certain metals and particular rocks, and between certain classes of ores and peculiar mineralogical and geological conditions. It is at the same time a vast one, and I can to-night only give you a few illustrations of the chemistry of the earth's crust, and the laws of the terrestrial circulation, which I have compared to that of the blood distributing throughout the animal frame the elements necessary for its growth. The analogy is not altogether new, since a great French geologist, ELIE DE BEAUMONT, has already spoken of a terrestrial circulation in regard to certain elements in the earth's crust, though he has not, so far as I am aware, carried it out to the extent which I propose to-night in my attempt to explain some of the laws which have presided over the distribution of metals in the earth.

The chemist in his laboratory takes advantage of changes of temperature and of the action of various solvents and precipitants to separate in the humid way one element from another, but to these agencies, in the economy of nature, are added others which we have not yet succeeded in imitating, and which are effected only in growing animals and plants. I repeat it, I do not wish to say that these latter processes are different in kind from those which we command in our laboratories, but rather that these organisms control a far finer and more delicate chemical and physical apparatus than we have yet invented. Plants have the power of selecting from the media in which they live the elements necessary for their support. The growing oak and the grass alike assimilate from the air and waters the carbon, hydrogen, nitrogen and oxygen which build up their tissues, and at the same time take from the soil a portion of phosphorus, which, though minute, is in both cases essential to the vegetable growth. The acorn of the oak and the grass alike become the food of animals, and the gathered phosphates pass into their bones, which are nearly pure phosphate of lime. In like manner the phosphates from organic waste and decay find their way to the sea, and through the agency of marine vegetation become at last the bony skeletons of fishes. These are, in turn, the prey of carnivorous birds, whose exuvia form on tropical islands beds of phosphatic guano. A history not dissimilar will explain the origin of beds of coprolites and other deposits of mineral phosphates.

But again these plants or these animals may perish in the sea and be buried in its ooze. The phosphates which they have gathered are not lost, but become fixed in an insoluble form in the clayey matter; and when in the revolutions of ages, these sea-muds, hardened to rock, become dry land, and crumble again to soil, the phosphates are there found ready for the wants of vegetation.

Most of what I have said of phosphates applies equally to the salts of potash, which are not less necessary to the growing plant. From the operation of these laws it results that neither of these elements are found in large quantities in the ocean. This great receptacle of the drainage from the land, contains still smaller quantities of iodine; in fact the traces of this element present in sea water can scarcely be detected by our most delicate tests. Yet marine plants have the power of separating this iodine and accumulating it in their tissues, so that the ashes of these plants are not only rich in phosphates and in potash salts, but contain so much iodine that our supplies of this precious element are almost wholly derived from this source, and that the gathering and burning of sea-weed for the extraction of iodine is in some regions an important industry. When this marine vegetation decays, the iodine which it contains appears like the potash and phosphates to pass into combinations with metals, earths or earthy phosphates, which retain it in an insoluble state, and in certain cases yield it to percolating saline solutions, which thus give rise to springs rich in iodine.

In all of these processes the action of organic life is direct and assimilative. but there are others in which its agency, although indirect, is not less important. I can hardly conceive of an accumulation of iron, copper, lead, silver or gold, in the production of which animal or vegetable life has not either directly or indirectly been necessary, and I shall begin to explain my meaning by the case of iron. This, you are aware, is one of the most widely diffused elements in nature; all soils, all growing plants contain it; and it is a necessary element in our blood. Clays and loams contain however, at best, two or three hundredths of the metal, but so mixed with other matters that we could never make it available for the wants of this iron age of ours. How does it happen that we also find it gathered together in great beds of ore which furnish an abundant supply of the metal? The chemist finds that the iron, as diffused in the rocks, exists chiefly in combination with oxygen, with which it forms two principal compounds; the first or protoxyd, which is readily soluble in water impregnated with carbonic acid or other feeble acids, and the second or peroxyd, which is insoluble in the same liquids. I do not here speak of the magnetic oxyd, which may be looked upon as a compound of the other two, neutral and indifferent to most natural chemical agencies. The combinations of the first oxyd are either colorless or bluish or greenish in tint, while the peroxyd is reddish-brown and is the substance known as iron-rust. Ordinary brick-clays are bluish in color, and contain combined iron in the state of peroxyd, but when burned in a kiln they become reddish, because this oxyd absorbs from the air a further proportion of oxygen, and is converted into peroxyd. But there are clays which are white when burned, and are much prized for this reason. They are used for pottery and for the manufacture of fire-bricks to resist a great degree of heat. Many of these were once ferruginous clays, which have lost their iron by a process everywhere going on around us. If we dig a ditch in a moist soil which is covered with turf or with decaying vegetation, we may observe that the stagnant water which collects at the bottom soon becomes coated with a shining, iridescent scum, which looks somewhat like oil, but is really a compound of peroxyd of iron. The water as it oozes from the soil is colorless, but has an inky taste of iron from dissolved protoxyd of iron, when exposed to the air, however, this absorbs oxygen, and a peroxyd is formed which is no longer soluble but separates as a film on the surface of the water, and finally sinks to the bottom as a reddish ochre, which is chiefly peroxyd of iron; or under somewhat different conditions becomes aggregated as a massive iron ore. A process identical in kind with this has been at work at the earth's surface ever since there were decaying organic matters, dissolving the iron from the porous rocks, clays and sands, and gathering it together in beds of iron-ore or iron-ochre. It is not necessary that these rocks and soils should contain the iron in the state of protoxyd, since these organic products, (which are themselves dissolved in the water,) are able to remove a portion of the oxygen from the insoluble peroxyd, and convert it into the soluble protoxyd of iron, being themselves in part oxydized and converted into carbonic acid in the process.

We find in rock-formations of very different ages beds of sediments which have been deprived of iron by organic agencies, and near them will generally be found the accumulated iron. Go into any coal-region, and you will see evidences that this process was at work when the coal-beds were forming. The soil in which the coal-plants grew has been deprived of its iron, and when burned turns white, as do most of the slaty beds from the coal-rocks. It is this ancient soil which constitutes the so-called fire-clays, prized for making fire-bricks which from the absence of both iron and alkalies are very infusible. Interstratified with these we often find, in the form of iron-stone, the separated metal, and thus in the same series of rocks may be found the fuel, the ore and the fire-clay.

TO BE CONCLUDED.

American Institute of Mining Engineers.

OFFICIAL BULLETIN.

Announcements to Members and Associates.

I. The dues for the year ending May, 1873, are now payable. All members and associates who have not paid their dues are requested to do so at once, by sending in postal orders or checks, or money, ten dollars to the Secretary.

All members and associates who pay their dues for each current year, strictly in advance, will have sent to their address, regular and weekly, the ENGINEERING AND MINING JOURNAL, which is the organ of the Institute, and will contain the proceedings and transactions and all important papers read before the Institute, and all notices of meetings. Back numbers, cannot, as a general rule, be sent.

II. It is expected that the more important papers read before the institute, and the debates thereon, will be published in annual or occasional volumes to which those members and associates will be entitled who have paid their dues.

III. Authors of papers are requested to notify the Secretary in advance of the meetings, giving the subject and length of their papers. Attention is also called, in this connection, to Rules 12 and 13.

IV. The ninth rule has been amended, so that there will be hereafter three meetings a year, in February, May and October. The meeting next October will be held at Pittsburgh, Pa.

MARTIN CORYELL, Secretary.

WILKESBARRE, Pa.

MINING SUMMARY.

Increase of Mining Stock Capital.

From the San Francisco *Bulletin* of May 17.

The business of "watering" Stocks is quite active just now. The practice is neither new nor encouraging while in some cases it is quite questionable. When an incorporation, through a prosperous business, accumulates a large surplus, it is legitimate to divide a portion of that surplus among shareholders by cash or stock dividends; or when an incorporation wishes to enlarge its business, and has not the means at hand, it is legitimate to levy an assessment on stockholders, either directly or by the addition of capital stock. Many of the business and financial incorporations of the city have increased their capital in some one of the ways thus pointed out. But when an incorporation, without other assets than its capital, enlarges its issue and floats it upon the public market, beyond the necessities of its business, its course is open to criticism. Such is the case with some of the mining incorporations now seeking to enlarge their capital. For legitimate mining no such capital is required as many of these companies represent. For stock gambling, however, a large number of shares is desirable; it is also convenient when it comes to the levying of assessments. The capitals of the various mining companies have been changed several times since their organization. The ball was set in motion this year, we believe, by the Daney Company,

which in January raised the capital from $480,000 to $2,400,000, and trebled the number of shares. On the 17th April, the Hale & Norcross Mining Company doubled both capital and shares. On the 24th April, the Bullion Mining Company increased the capital from $2,000,000 to $10,000,000, and the shares from 5,000 to 25,000. On the 3d May, we published a list of eleven companies who propose to follow the same example. Since then, seven more companies have come out with similar propositions, and we append the complete list as follows:

WATERING MINING STOCKS.

NAME OF COMPANY.	PRESENT CAPITAL. Capital.	Shares.	Value.	PROPOSED CAPITAL. Capital.	Shares.	Value.	WHEN TO BE DECIDED.
Alamo Gold Mining Company	$360,000	3,600	$100	$3,600,000	30,000	$100	June 10th.
Bacon Mill and Mining Company	800,000	4,000	200	2,400,000	24,000	100	June 1st.
Belcher	1,040,000	10,400	100	10,400,000	104,000	100	May 24th.
Best & Belcher	448,000	4,480	100	864,000	8,960	100	May 13th.
Confidence	780,000	1,560	500	2,496,000	24,960	100	June 4th.
Consolidated Virginia	5,880,000	11,600	500	7,680,000	25,600	300	May 20th.
Crown Point	2,000,000	12,000	250	10,000,000	100,000	100	May 15th.
Del Rey	100,000	1,000	100	3,000,000	30,000	100	June 10th.
Empire Mill and Mining	1,000,000	1,200	833⅓	5,000,000	50,000	100	June 10th.
Golden Age and Empire	650,000	2,600	250	2,600,000	26,000	100	May 27th.
Gold Canyon Consolidated	700,100	3,500	200	3,500,000	35,000	100	May 31st.
Green Gold and Silver	600,000	2,400	250	2,400,000	24,000	100	June 3d.
Hale & Norcross	3,200,000	16,000	200	9,600,000	48,000	200	May 30th.
Imperial	2,000,000	4,000	500	10,000,000	100,000	100	June 3d.
Kentuck	400,000	2,000	200	4,000,000	20,000	200	June 10th.
Overman	1,980,000	12,800	100	6,400,000	64,000	100	June 5th.
Senator	600,000	6,000	100	2,400,000	24,000	100	May 31st.
St. Louis	500,000	5,000	100	1,000,000	10,000	100	June 6th.
Total	$23,198,000	104,540		$87,172,500	746,510		

An examination of the above table shows an increase of 300 per cent. in the amount of capital and 600 per cent. in the number of shares. Such an augmentation of capital and shares is of course entirely unnecessary, and is largely done in the interest of those who care more for Stock gambling than they do for the legitimate development of our mining interests. The idea of a large capital and a multiplicity of shares was never heard of in connection with the organization of the early mining companies. From $1,000,000 to $3,000,000 capital was considered quite enough for the best mines on the Comstock lode, while from 2,000 to 20,000 shares was considered amply sufficient, only four out of the thirty-two claims in that district having an excess of the maximum number. It was only when the White Pine mining excitement seized the community that large capitals and numerous shares were thought necessary. For a time there seemed to be no end to the organization of companies to work in that district but since then an end has come to most of them. Of the two or three hundred incorporations then formed, with their millions upon millions of capital, very few have now any corporate existence, and of these few not one has paid a dividend in over a year, unless it be some claims sold to English capitalists. And yet these companies had from 20,000 to 50,000 shares each, and from $2,000,000 to $10,000,000 capital (on paper). The companies organized about the same time in the Ely district were equally lavish of capitals and shares, having from 20,000 to 60,000 shares. Thus far only two of the companies in that district have made any returns from their capital. We are now in the midst of another mining excitement. A few months ago, large and rich bodies of ore were developed in the lower levels of the Belcher and Crown point claims. Since then there have been some favorable indications in the deep levels of Savage and Yellow Jacket. During the interval there have been scores upon scores of mining companies incorporated, many of which will probably never hold their second annual meeting, while the amount of paper capital in the older companies has been increased over $70,000,000.

Colorado.

From the Denver News of May 29.

THE SILVER POINT.

It is evident that as time advances the mines of Colorado prove richer and more extensive. Hardly a month passes that we do not hear of one or more rich lodes being discovered in some of the various mining districts of our territory. On Idaho hill, in Grand Island district, about one thousand yards from the Caribou mine, an exceedingly rich lode has recently come to light. The discovery was made a year ago this spring, but for the purpose of first perfecting a bona fide title, and so avoid any litigation that might arise by reason of adverse claims, the parties were shrewd enough to keep the whole matter a profound secret until within the past two months. It has now just leaked out that this Company has a lode equally as rich in proportion to its development as the Caribou, and it is conceded by old and reliable miners that it ranks second to none in that district, and there are strong indications that it may even equal, if not surpass, the Caribou, when it shall have been as well developed, The lucky owners of the "Silver Point" are Messrs Moore, Sweder and Livernash, the latter a skillful assayer. They are now down sixty-two feet; have erected a substantial shaft-house, and the shaft is timbered from top to bottom in the most thorough manner. The crevice between the main walls is about five feet in thickness, and the pay-streak is from six to twenty inches in width. The crevice matter is composed of silver sulphurete, carbonate of copper, and—what is seldom found at a depth of less than one hundred feet—silver glance.

Of the assays thus far made, some have run as high as $8,000 per ton. One assay of second-class ore showed $1,836,42, and in order to test the correctness of the above assay, Mr. Moore had a piece of the same quality assayed at the branch mint in Denver, and the certificate shows silver $1,847,65. Another assay made at the works of Breed & Cutter, gave $2,600 in silver per ton. The Company are developing this new-found treasure as rapidly as possible, and they are greatly stimulated in their efforts from the fact of its growing better and better as they go down. This mine is advantageously situated, on the very summit of the mountain, where the slope is such that no water will ever enter the shaft, or in the least interfere with mining operations.

Mr. S. S. Moore, one of the owners of the property, is a reliable and experienced California miner; but having faith in the mines of Colorado, he came here a few years ago to make a practical test of their worth. This recent discovery, then, is the result of his faith and perseverance; working, of course, in conjunction with his associates. It seems to be the universal expression among all who are acquainted with the facts, that a fortune could have fallen into no worthier hands.

Below we append the result of an assay of some of this ore just completed at the branch mint in Denver.

UNITED STATES BRANCH MINT,
DENVER, May 23, 1872.

This is to certify that I have this day assayed five samples of silver ore from the Silver Point lode, Grand Island district, Boulder County, Colorado Territory, and obtained the following result per ton of two thousand pounds avoirdupois:

No. 1. 6,999, 60-100 oz. silver, in coin		$9,049 78
No. 2. 5,168, 03-100 oz. silver, in coin		6,718 40
No. 3. 379, 14-100 oz. silver, in coin		492 88
No. 4. 5, 23-100 oz. gold.	120 50	
484, 13-100 oz. silver.	629 36	
Total in coin	$749 86	
No. 5. 1,831, 56-100 oz. silver, coin value		$2,381 02

Samples Nos. 1, 2, 3 and 5 were not tested for gold.

Respectfully,
JACOB F. L. SCHIRMER

ANOTHER RICH MINE.

John F. Schutte, of Summit County, showed us yesterday a mass of quartz, of several pounds weight, that was literally studded and spangled with gold. It was taken from the Bismarck lode, near Galena gulch, in the county named. The lode was found nearly a year ago and developed during the past winter. The specimen referred to was taken out at a depth of thirty feet. The shaft is now down fifty-five feet, well-timbered and in good shape for working the mine. The water has become troublesome and pumps will be necessary before going much deeper. The vein is from four to six feet wide, of even, easy working and good paying mill quartz. It belongs to Schutte, Biland and O'Niel, and has doubtless been one of the important feeders to the wonderful rich placers in Galena gulch.

Work has been resumed in the placer diggings of that neighborhood, but snow and water are so abundant yet that not much can be done beyond preparation. A busy and prosperous season is confidently expected by everybody.

From the Georgetown *Miner* May 16.

The concentrating works of Arey & Co. begin to assume shape and put on an appearance of magnitude. The engine room is up and the engine in place.

Mr. Manager PIERCE, of the Swansea Works, informs us that he will be ready for the purchase of ores as soon as he can get ore sheds put up. It is the expectation to begin the work of smelting with reverberatory furnaces of a capacity of about eight tons per day. Mr. P. hopes to be at work in two months from the present time.

Visiting the Stewart Co's Reduction Works this week, we found that work has been resumed on the Arey Furnace brick stack. The frame for the Arey Furnace Building is all up, ready for the roof. A score or more of men in charge of Mr. A. J. AUGUST, foreman, were laying shingles on the main building. Mr. G. W. TULL, master mill-wright, is fast putting up the finishing touches on the battery. The work of removing the old mill is going forward.

THE MAIN LODE.—Last week we referred to the recent sale of this mine to Messrs. Glenn and Marshall. Of the amount paid for the property, we have not been advised. It has, however, been variously stated in our exchanges, from 50 to $100,000. Whatever may be the exact sum, the mine is undoubtedly worth it all, with a margin besides. We give some additional items of interest.—The mine is undoubtedly one of the largest and most valuable in Colorado.—With the present development it is producing fifty tons of ore per week, which gives an average yield of two hundred ounces silver and and forty-two per cent lead per ton. The working of the mine is under the immediate management of Gen. MARSHALL, who has adopted a working plan for the first section which is composed of five hundred feet (three hundred west and two hundred feet east from the discovery on the vein.) Two shafts, about two hundred feet apart, are to be sunk continuously, and connected by levels run every sixty feet, said levels or drifts to be continued east and west from the shafts to either end of the section.—The shafts so connected will, as soon as the first level is completed, give perfect ventilation to the entire section. Judging from the production with the present limited amount of stoping ground opened, it will be impossible to estimate the immense amount to be produced as soon as the levels can be run.

Nevada.

From the Reese River *Reveille* of June 1.

REESE RIVER.

FREEHOLD.—No material change since last week; a little ore coming out daily.

GROVE TUNNEL.—Looking well in both east and west levels. A contract has been let for sinking the incline still further. Twelve men are employed.

DOLLARHIDE INCLINE.—The cross-cut reached the ledge this week, but found it in the break; explorations will will be instituted on the lead next week.

ISABELLA.—Not much change since last week, except at the lower level, O'Connell ledge, where Messrs. GOLDSWORTHY & ROBERTS, who have a lease, have just got into an apparently rich body of ore. Messrs. LEE & Co. continue to get lots of good ore out of the ground covered by their lease.

WEST TROY.—The body of ore struck some weeks ago unceremoniously "petered out," but the boys are going ahead with their work.

SAYBROOK.—The 150-foot east level is in 45 feet; considerably fair ore coming out, some of it first class. Two men are breasting in 110-foot east level. Some ten tons of ore are now on hand.

STAR OF NEVADA.—A little over a month ago the main tunnel cut a ledge which was named the "Cope;" work was discontinued on the tunnel on account of bad air, and soon after levels were started each way on the new ledge, which is from six to fourteen inches wide, of very fair ore and improving; the best rock coming from the west level. A crosscut which is being run from the Star of Nevada level to tap the Hazel Green ledge, exposed a blind ledge last week, which is from six to eight inches wide, and looks promising. Ore is coming out of the various workings mentioned in detail some weeks since. The work is all being done by lessees and contractors. Fourteen men are at work; the force will be increased next week. The ore house is still full of rock.

MORGAN AND MUNCEY.—Breasting at the 310-foot east

level in a big ledge of $300 ore; struck a ledge last week at the 200-foot east level which carries four inches of from $700 to $800 ore; sinking the incline; have a good deal of water; ten men at work; 20 tons of ore on hand.

FLORIDA.—Breasting at the 300-foot east level, and at the 200-foot east level; getting some average ore; work continues at the 500-foot west level at which point the ledge is barren; ten men at work.

PRUYN AND PULLEN.—No change reported; prospecting still going on.

SOUTH SONOMA.—Driving the upper level ahead; prospects good.

LANE AND FULLER—PACIFIC CO.—But little change since last week; mine continues to show first-rate at all points; about four tons of high grade ore are coming out daily; between 80 and 90 tons are now being worked at the Manhattan mill.

IOWA TUNNEL.—A recent crushing of ore from this location shows that rock is of very high grade. We failed to get full particulars.

OREGON.—A large number of men are employedin this mine and everything is going along as reported last week.

SEMANTHE.—Temporaily shut down till a crushing of the ore on hand can be had.

SARATOGA.—If anything, better than ever. We were present when a car load of rock came up yesterday, and it made our palms itch to see Roberts tugging at the huge lumps of brilliant ruby ore; there appeared to be scarcely a pound of rock in the whole car load that would work less than at the rate of a thousand per ton.

CAMARGO.—This claim is on the Whitlatch Union ledge. The Manhattan Co. have hoisting works on the mine; the engineer in charge was a new comer and didn't know what was being done or purposed, so we could get no information concerning the mine.

WHITLATCH UNION.—REED & Co., are breasting out a large body of ore, of which there must be fully 100 tons. The Manhattan company are putting up hoisting works over the point where the ledge, below the break, was found, and will proceed to "go for it" immediately. MESSRS. ANDERSON & COOK, who have leased a portion of the ground south of REED & Co., have started a new shaft last week; after sinking four or five feet they struck a magnificent body of chloride which they are now engaged in sinking on and breasting out at the depth of ten or twelve feet; the deposit appears to be immense.

IRONCLAD.—MR. BOWEN, the owner, is putting up a whim to work this mine, The incline is 120 feet deep, showing good rock at the bottom.

SAM BRANNAN.—The 150-foot west level is in a distance of 30 feet in good ore; west level in 35 feet, getting high grade ore; nothing doing at present in the incline; will start a shute from the east level next week, three tons of high grade ore in the ore house.

DIANA.—Work continues here same as last week; nothing new from the mine since last week's review.

GIRARD.—Developments progressing slowly; getting some good ore.

BOOTJACK.—Temporarily shut down by Superintendent CARTHRAE, to repair the left leg of the gallows frame of the hoisting works.

Advertisements.

The special advantages of the ENGINEERING AND MINING JOURNAL, *as a medium for advertisers, are so great and so widely known that it may seem almost needless to call attention to them. It is extensively circulated among the engineers of the country and takes a position in this respect before any other publication of the kind. It has a large and constantly increasing circulation among miners and mine owners, and men connected with mining operations generally. As it is the only paper in the country that makes this subject a specialty it has this field entirely to itself, and is the only direct and reliable means of reaching this class of persons. Being kept on file by almost every subscriber, it is doubly valuable as a permanent means of keeping an advertisement before the public. It is the Organ of the* AMERICAN INSTITUTE OF MINING ENGINEERS, *and is regularly received and read* BY ALL THE MEMBERS AND ASSOCIATES *of that large and powerful society.* THE ONLY ONE OF THE KIND IN THIS COUNTRY. *It is therefore the best medium for advertising all kinds of machinery, tools and materials used by engineers or their employees. It is the recognized organ of the coal trade, and is taken extensively by the trade throughout the country, and presents the very best means of reaching that very important class of men.*

Rates of Advertising.

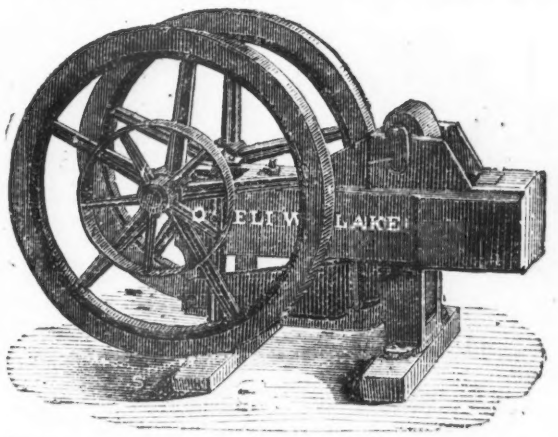
The rates of advertising, compared with those of other weekly industrial publications, are very low, especially when the class of consumers among which its large circulation is almost entirely confined, is taken into consideration.

Back Page ..... 40 cents a line.
Inside Pages ..... 25 cents a line.
Engravings may head advertisements at the same rate per line, by measurement, as the letter-press.

TUNGSTATE OF IRON OR WOLFRAM ORE, imported specially for Steel Makers, by
L. & J. W. FEUCHTWANGER,
55 Cedar street, N. Y.

MISCELLANEOUS.

BLAKE'S STONE BREAKER.



The office of this Machine is to break Ores and Minerals of every kind into small fragments, preparatory to their further comminution by other machinery.

This machine has now been in use, enduring the severest tests, for the last ten years, during which time it has been introduced into almost every country on the globe, and is everywhere received with great and increasing favor as a labor-saving machine of the first order.

Illustrated circulars, fully describing the machine, with ample testimonials to its efficiency and utility, will be furnished on application, by letter to the undersigned.

☞ The Patents obtained for this machine in the United States and in England having been fully sustained by the courts, after well contested suits in both countries, all persons are hereby cautioned not to violate them; and they are informed that every machine now in use or offered for sale, not made by us, in which the ores are crushed between upright convergent faces or jaws actuated by a revolving shaft and fly-wheel, are made and used in violation of our patent.

Mch. 14-1y. **BLAKE BROTHERS, New Haven, Conn.**

JOHN A. GRISWOLD, ERASTUS CORNING,
ERASTUS CORNING, JR., CHESTER GRISWOLD.

JOHN A. GRISWOLD & CO.,

PROPRIETORS OF THE

RENSSELAER IRON WORKS,
TROY, N. Y.

Bessemer Steel Works, Fort Edward Blast Furnace and Columbia Blast Furnace

MANUFACTURERS OF PIG IRON, RAILROAD, MERCHANT AND SHIP IRON,

Bessemer Steel Rails, Axles, Tyres, Shafting Plates and Steel Forgings,

OF ALL DESCRIPTIONS.

Office in New York, No. 56 Broadway.

May 17:1y

LEHIGH ZINC COMPANY.

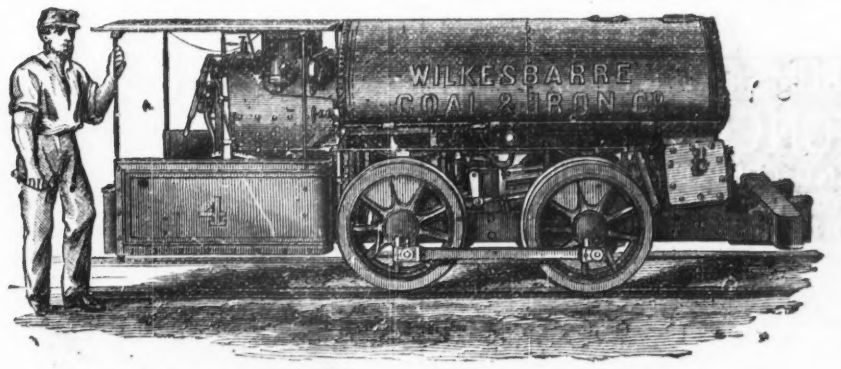
GORDON MONGES, Treasurer. B. C. WEBSTER, President

WORKS, BETHLEHEM, PA OFFICE, 333 Walnut Street, Philadelphia.

JOHN JEWETT & SONS, AGENTS, 182 FRONT STREET, NEW YORK.

OXIDE OF ZINC, SPELTER, SHEET ZINC.

Jun28:1y **SPIEGELEISEN CINDER FOR BLAST FURNACES.**



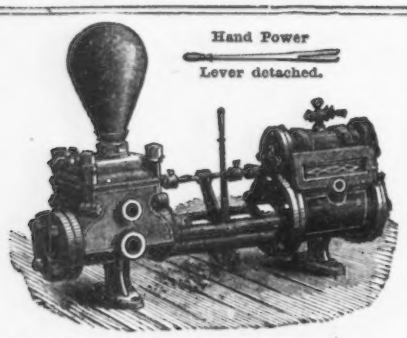
IMPROVED DIRECT-ACTING MINING LOCOMOTIVE

Gauge, two feet six inches or upwards; Hight above rail, five feet four inches; Width over all, five feet one inch. Adapted to burn Anthracite or Bituminous coal or coke.

Materials and Workmanship Equal to those in Full Gauge Railroad Locomotives.

Guaranteed to pass curves of twenty-five feet radius and haul on a level track in good condition
Three Hundred and Forty Gross Tons of Cars and Load
For Photograph and full particulars, address **M. BAIRD & CO.,**
Feb:7-1y:eow Baldwin Locomotive Works, Philadelphia

MACHINISTS' SUPPLIES.



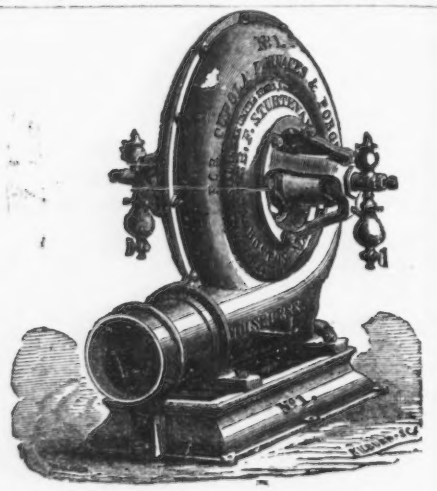
GEO. F. BLAKE & CO.,
MANUFACTURERS OF BLAKE'S PATENT
STEAM PUMPS.
No. 79 LIBERTY STREET, NEW YORK.
Factory 61 Chardon St., Boston, Mass.

A specialty made of the manufacture of DOUBLE-ACTING PLUNGER PUMPS for mining purposes—combining economy of space, capacity, and great durability. All wearing parts made of composition metal.

Also, Boiler Feed Pumps, Fire Pumps, Tank Pumps, Wrecking Pumps, etc., etc.

Send for Illustrated Price Circular. m-26 3m

WARING'S
AIR COMPRESSORS,
ENGINES, PUMPS AND BOILERS,
DRAWINGS AND SPECIFICATIONS OF MACHINERY.
WARING & PARKE, Engineers.
jan23:1y 133 Centre Street, New York.



B. F. STURTEVANT'S
PATENT IMPROVED
PRESSURE BLOWER,
FOR CUPOLA FURNACES AND FORGES.

Also manufacturer of the Sturtevant Patent Improved Fan Blower and Exhaust Fan. Send for illustrated catalogue.

B. F. STURTEVANT, 72 Sudbury street, Boston, Mass.
n29:1y

KROM'S PATENT DRY ORE CONCENTRATOR
AND COMPLETE MACHINERY
FOR CRUSHING SCREENING
AND CONCENTRATING ORES.

Minerals and Ores in which the difference of specific gravity is so slight and which are also sometimes in such fine particles as to defy separation by any other machinery or method, are rapidly separated by this Concentrator.

Mr. W. Bement, of Georgetown, Col., concentrating Silver Ores, says: "I am satisfied your machines can not be beaten; they are simple, require no power (comparatively,) and do not get out of order."

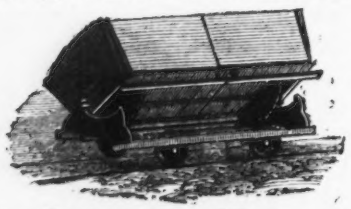
A comparison is challenged between the results obtained by the approved methods of water concentration and the complete system of dry-ore concentration in the amount of ore saved, quantity concentrated, economy of working, and comfort of the operators and workmen.

Parties interested in mining are invited to call at No. 210 Eldridge street, New York, where they may see a machine in operation and have samples of their own ores crushed and concentrated.

For information and circulars, apply to
S. R. KROM,
No. 210 Eldridge street, New York City.

MINING MACHINERY, ETC.

Peteler Portable Railroad Comp'y
OFFICE, 42 BROADWAY, NEW YORK.



To Contractors, Miners, etc.

By this invention one horse does the work of ten, and one man the work of eight.

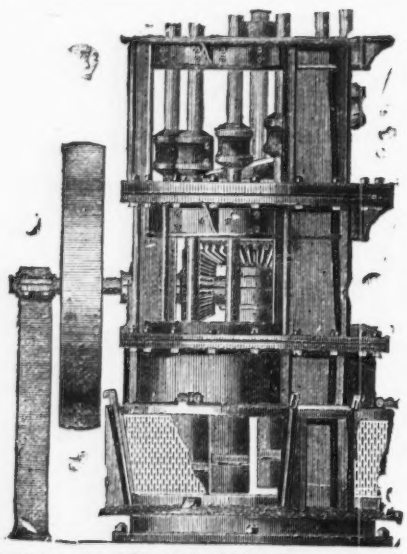
The great labor-saving invention of the age.

CARS AND TRACKS FOR SALE.

Samples at the office. New Illustrated Circulars free. State Rights for sale.

LOUISIANA PORTABLE RAILWAY COMPANY,
37 Carondelet street.
New Orleans, La.

WHERE STATE RIGHTS MAY BE OBTAINED.
J. B. BROWN,
may22-3mo 170 La Salle street, Chicago, Ill.



HOWLAND PATENT ROTARY BATTERY

of 12 stamps. It requires no frame to put it up. The best Battery ever used for amalgamating gold or crushing silver ores, dry or wet. Can be put up on a mine in running order for one-half the price of the straight battery, and in three days after its arrival at the mine. 12-stamp battery, 20,000 pounds. with frame complete; 6-stamp battery, 7,900 pounds. Every mill run at shop before shipping.

CALIFORNIA STAMP MILLS,

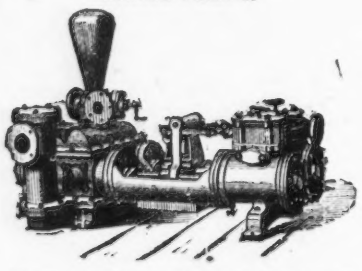
All the various styles of Pans, Amalgamators, Rock Breakers, Separators, Settlers, Concentrators, Dry or Wet, for working Gold, Silver or Copper Ores, the same as built in California and at lower prices. SHOES AND DIES made of the best white iron. Send sizes and we will make patterns and forward Shoes and Dies at low prices. Engines, Boilers and fixtures, and other Machinery made to order.

Send for a Circular.
Address MOREY & SPERRY,
Jan 6.6m 95 Liberty Street New-York.

HYDRAULIC WORKS.
MANUFACTORY,
BROOKLYN, N. Y.

Steam Pumping Engines, Single and Duplex, Worthington's Patent, for all purposes, such as Water Works Engines, Condensing or Non-condensing; Air and Circulating Pumps, for Marine Engines; Blowing Engines; Vacuum Pumps, Stationary and Portable Steam Fire Engines; Boiler Feed Pumps, Wrecking Pumps,

MINING PUMPS,



Water Meters, Oil Meters; Water Pressure Engines.

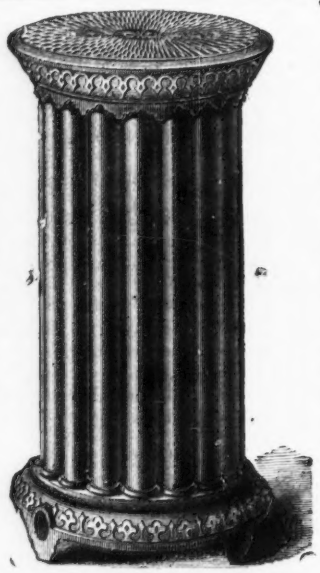
Steam and Gas Pipe, Valves, Fittings, etc. Iron and Brass Castings.

Send for Circular.

H. R. WORTHINGTON,
jan2-1y 59 Beekman street, New York

ENGINES, IRON WORK, ETC.

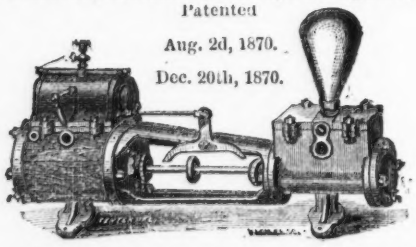
NASON'S VERTICAL TUBE RADIATORS IN VARIOUS SIZES AND PATTERNS.



JOSEPH NASON & CO., 61 BEEKMAN ST., corner of Gold street.—WROUGHT and CAST-IRON PIPES; all kinds of STEAM and GAS FITTINGS; Apparatus for WARMING and VENTILATING BUILDINGS.

JOSEPH NASON. HENRY R. WORTHINGTON.
nov29-1y

THE SELDEN DIRECT-ACTING
STEAM PUMP,
A. CARR, Manufacturer & Proprietor.
Patented
Aug. 2d, 1870.
Dec. 20th, 1870.



Combining simplicity and durability to a remarkable degree. Its parts are easy of access, and it is adapted to ALL PURPOSES for which Steam Pumps are used.

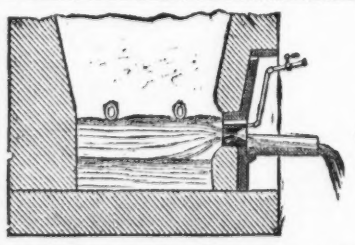
AS A MINING PUMP
It is unsurpassed. Also,

Steam, Gas and Water Pipe, Brass Work. Steam and Water Gauges, Fittings, etc., etc

Send for Price-List and Circulars.

Address A. CARR.
feb15.72:24 43 Courtlandt, Street New York.

BLAST FURNACES.



BLAST FURNACES.
LURMANN'S PATENT.
GEORGE ASMUS, - - ASSIGNEE,
90 BROADWAY, N. Y. n21:1y

ASBESTOS FOR FELTING AND PACKING Machinery, Fluorspar, Felspar, Flint-Quartz—all the Metallic Oxides, for sale by
L. & J. W. FEUCHTWANGER,
55 Cedar street, N. Y.

HUNT UP YOUR OLD OIL STOCKS! And see what they are worth. A Complete history of Oil Stock Companies. How to detect impure Oils. How to prevent accidents. All about the production and manufacture of all kinds of Oil.

Accurate market reports and prices in every number.

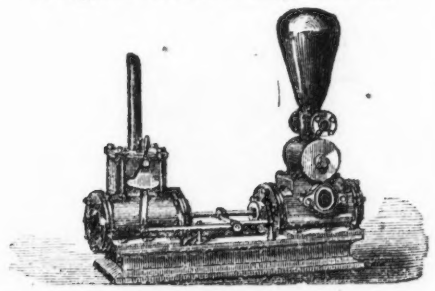
Every one who buys, sells or uses Oil of any kind, ought to subscribe for

THE NATIONAL OIL JOURNAL,
Pittsburgh, Pa.
Price, $1.00 per year. April 23:tf

BLOODSTONE AND LOADSTONE, METALS of Cadmium, Bismuth, Antimony, Tin, Cobalt, Arsenic, Platina, Aluminium, for sale at Lowest Prices by
L. & J. W. FEUCHTWANGER,
55 Cedar street, N. Y.

STEAM PUMPS.

Niagara Steam Pump Works.



This Pump has taken the first premium at every Fair in the United States where there has been a practical test.

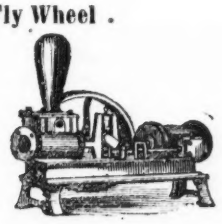
CHARLES B. HARDICK,

No. 23 ADAMS STREET, BROOKLYN, N. Y.,

Sole Manufacturer of
HARDICK'S PATENT DOUBLE-ACTING
STEAM PUMPS AND FIRE ENGINES,
Patented in England, Belgium and France. Send for circular. feb-13-1y

J. CLAYTON'S
Patent Fly Wheel.

STEAM PUMP,
AND
STEAM ENGINE
COMBINED.



These pumps are the cheapest first-class pumps in the market.
All sizes made to order at short notice.

JAMES CLAYTON, 24 & 26 Water st.,
Nov18-1f Brooklyn, N. Y.
Office: 50 & 52 John street, New York.

STEAM PUMPS,
Double Acting.
Bucket Plungers are the best. Send for Circular. Valley Machine Co. Easthampton, Mass

CIRCULAR SLIDE VALVE.—TO RAILROAD Managers and other users of Steam Power.—I will guarantee an addition to the working power of any Locomotive or Slide-Valve Engine of one-third to one-half at very small cost. No increase of running expenses. Tests desired everywhere. Circulars free.
may28-4t. J. F. TALLANT, Burlington, Iowa.

SCHOOL OF MINES, COLUMBIA COLLEGE.

FACULTY.—F. A. P. BARNARD, S.T.D., LL.D., PRESIDENT; T. EGLESTON, JR., E. M., Mineralogy and Metallurgy; F. L. VINTON, E. M., Civil and Mining Engineer; C. F. CHANDLER, PH. D., Analytical and Applied Chemistry; JOHN TORREY, M.D., LL.D., Botany; C. A. JOY, PH. D., General Chemistry; W. G. PECK, LL.D., Mechanics; J. H. VAN AMRINGE, A.M., Mathematics; O. N. ROOD, A.M., Physics; J. S. NEWBERRY, M.D. LL.D., Geology and Paleontology. Regular courses in Civil and Mining Engineering; Metallargy; Geology and Natural History; Analytical and Applied Chemistry. Special students received for any of the branches taught. Particular attention paid to Assaying. For further information and catalogues, apply to

Nov. 21:1y DR. C. F. CHANDLER, Dean of the Faculty.

TIN-LINED LEAD PIPE

Is a Block-Tin Pipe, heavily coated with solid lead. It is the best and cheapest Water Pipe when strength and durability are considered. By its use, iron rust, lead and zinc poison are all avoided, and general health promoted. Price 15 cents a pound for all sizes. Circulars and sample of pipe sent by mail free.

Address the COLWELL, SHAW & WILLARD MF'G. CO., No. 213 Centre Street, New York.

Also, Manufacturers of Block-Tin Pipe, Sheet-Lead, Lead-Pipe, Solder, &c.
Orders solicited and filled at sight. June 4:6mos

WOOD ENGRAVING

EXECUTED AT THE OFFICE OF

The Engineering and Mining Journal
No. 37 PARK ROW, NEW YORK CITY.

FERRACUTE MACHINE WORKS, BRIDGETON, N. J. PRESSES, DIES, and all FRUIT CANNERS' TOOLS a specialty. March19-3m

MISCELLANEOUS.

Zell's Descriptive Hand-Atlas of the World.

ORIGINAL IN STYLE OF ENGRAVING, COLORING, LETTERING AND GENERAL APPEARANCE.

An Index to every Map, and a General Index to the Whole Atlas.

Beautifully Engraved, and Printed in Colors, will be completed in twenty-five numbers, at fifty cents each, during the year 1872.

This will be the most Artistic, the Best, the most Reliable, and the most Recent.

No other Atlas in the country can approach it in beauty, finish and reliability. A sample number will be sent to any address upon receipt of twenty-five cents.

Zell's Popular Encyclopedia,

The best, latest and cheapest ever published; is the only COMPLETE ENCYCLOPEDIA written since the war, hence the only one giving any account of the late battles, and those who fought them.

Total cost, bound, to subscribers only, $32, a saving of over more than $ 00 over similar works.

A fifty cent specimen number, containing forty pages will be sent free for 10 cents. Agents and Canvassers wanted. Sold only by subscription. Address

April 23:3mos T. ELWOOD ZELL, Proprietor.

THE CINCINNATI AND TERRE HAUTE Railway Company,

Desirous of enlisting the attention of manufacturers to the advantage of locating manufacturing establishments upon the line of their Railway, will give to any Rolling Mill or Blast Furnace Company so locating forty (40) acres of ground for works, and the coal in one hundred (100) acres of Clay or Owen County, Indiana, block coal field; the ore from one hundred (100) acres of the Hardin, Pope or Massac County, Illinois, brown hematite beds, and agree to furnish them with all orders for merchant iron required for the Railway's use for a period of two years.

To any Railway or Car Manufactory located upon its line, they will give twenty acres of ground required for works, the timber from one hundred acres of the best oak timbered land in Owen County, and an order for one thousand cars to commence work upon

To any Car Wheel Foundry or Axle Forge, the necessary grounds for works, and liberal orders for their products in kind.

To all other manufacturing establishments ample facilities in the locating and successful prosecuting of their works.

Circulars descriptive of the manufacturing points upon the line of the Railway will be mailed to any address upon application to

MATT. P. WOOD,
Gen'l Sup't C. & T. H. R. R., Terre Haute, Ind.

THE
MECHANIC'S MAGAZINE
OF
SCIENCE,
NEW PATENTS, AND ALL MANUFACTURES, ENGINEERING, BUILDING, RAILWAYS, TELEGRAPHY, SHIP-BUILDING, FACTORY NEWS, ETC., ETC.

The Well-known LONDON MECHANIC'S MAGAZINE, Established 48 Years, Is the Oldest Technical Journal in the World.

It will be mailed to Subscribers in the States, for $2 50 half yearly.

166 Fleet Street, London.

"ENGINEERING."

"The leading Engineering Journal of the world," indispensable to every Civil, Mining, or Mechanical Engineer, can now be obtained post-paid at $9 30 currency, by remitting Post Office order to NEW YORK OFFICE "ENGINEERING," 176 Broadway. tf

SILICATES OF SODA AND POTASH, SOLUBLE or WATER GLASS, used for making the hardest known Iron Cement for Furnaces and Stove Founders' use, Safes, Iron Fronts, Railings, etc. Manufactured by
L. & J. W. FEUCHTWANGER,
55 Cedar street, N. Y.

FOR SALE—STATIONARY ENGINE. 100 H. P., With five boilers, frames, settings, &c. All complete and nearly new. Suitable for saw mill or similar purpose.
Apply BALDWIN LOCOMOTIVE WORKS,
June-11-4t Philadelphia.

STEPHEN S. LEE & SON,
Miners and Shippers of
GEORGE'S CREEK COAL,
SWANTON MINES,
No. 49 West Lombard street,
may28-tf BALTIMORE.

MARYLAND COAL CO.,

Miners and Shippers of the best George's Creek Cumberland Coal.
Office No. 12 Trinity Building.
W. W. BRAMHALL, Secretary & Treasurer.
A. CHAMBERLIN, President.
an23:1y JOHN K. SHAW, Vice President.

COAL SHIPPERS.

R. R. HEFFORD & CO.,
Forwarders and Dealers in
ANTHRACITE, CANNEL, BITUMINOUS AND BLOSSBURG
COALS,
OFFICE, No. 2 MAIN STREET AND No. 1 CENTRAL WHARF,
Docks opposite foot of Main Street,
BUFFALO, N. Y.
R. R. HEFFORD. JAMES KELLY.
Railroad Iron, Iron Ore and other heavy Freights Docked and Forwarded. april 9:3m

WILKESBARRE COAL,

MINED BY THE

Wilkesbarre Coal & Iron Co.

OFFICE:

NO. 80 BROADWAY

NEW YORK.

Orders received for

SHIPMENT BY RAIL

DIRECT FROM MINES,

OR FOR

RESHIPMENT FROM COMPANY'S WHARVES,

AT

Port Johnson and Hoboken, New Jersey.

CUMBERLAND COAL,

MINED BY THE
CONSOLIDATION COAL COMPANY,
Of the best quality for manufacturing, steam generating, domestic purposes.

Orders received by the Cargo at
New York Office, 71 Broadway.
New England Agency,
STEVENSON & PIERSON,
48 Kilby street, Boston.
Baltimore and Georgetown Agency,
G. MEREDITH, South Gay street,
mch7;tf Baltimore.

THE NEWBURGH ORREL COAL COMPANY

Mines at Newburgh, Preston Co., W. Va.
Company's Office, No. 52 S. Gay St. Baltimore, Md.
C. OLIVER O'DONNELL.....President.
CHAS. MACKALL.....Secretary
This Company offer their very superior Gas Coal at lowest market prices.

It yields 10,996 cubic feet of gas to the ton of 2,240 lbs. of good illuminating power, and of remarkable purity; one bushel of lime purifying 6,792 cubic feet, with a large amount of coke of good quality.

It has been for many years very extensively used by various Gas Companies in the United States, and we beg to refer to the Manhattan, Metropolitan, and New York Gas Light Companies of New York, the Brooklyn and Citizens' Gas Light Companies of Brooklyn, N. Y., the Baltimore Gas Light Company of Baltimore, Md., and Providence Gas Light Company, Providence, R. I.

The best dry coals shipped, and the promptest attention given to orders. sep21-1y

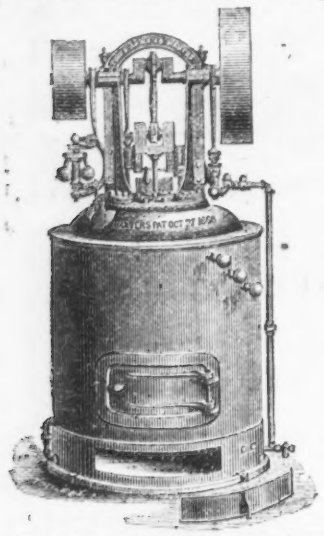
THE DESPARD COAL COMPANY OFFER THEIR Superior DESPARD COAL to Gas Light Companies throughout the country.
MINES IN HARRISON COUNTY, West Virginia.
Wharves, Locust Point, } Baltimore.
Company's Office, No. 29 South st. }
AGENTS:
PARMELEE BROTHERS, No. 32 Pine street, New York. BANGS & HORTON, No. 31 Doane street, Boston.
Among the consumers of Despard Coal we name Manhattan Gas Light Co., New York; Metropolitan Gas Light Co., New York; Jersey City Gas Light Co., Jersey City, N. J.; Washington Gas Light Co., Washington, D. C. Portland Gas Light Co., Portland, Maine.
☞ Reference to them is requested. may30-1y

COXE BRO.'S & CO., CROSS CREEK COLLIERY, MINers and Shippers of the Celebrated
Cross Creek Free Burning Lehigh Red Ash COAL
FROM THE BUCK MOUNTAIN VEIN.
OFFICES:
Philadelphia, No. 206 South Fourth street.
Drifton, Jeddo P. O., Luzerne Co., Pa.
Agent in New York, SAMUEL BONNELL, Jr.,
Room 43, Trinity Building
feb-1 111 Broadway.

DETMOLD & COX,
ANTHRACITE AND BITUMINOUS
COALS.
Office, 40 Trinity Building, New York. jan23:1y

Advertisements.

BAXTER ENGINE.



ENGINE READY FOR USE.

THE BAXTER STEAM ENGINE is manufactured by Colt's Patent Fire Arms Manufacturing Company of Hartford, Ct., whose reputation for exact mechanism is well known, and who fully guarantee their work.

Every Boiler is tested under inspection of the Hartford Steam Boiler Insurance Company, and by them guaranteed and insured.

We therefore feel justified in claiming that, in points of mechanical construction, safety, and durability, the

BAXTER ENGINE

as no equal; while in simplicity of construction, economy of space and fuel, it stands without a rival.

Over three hundred engines are now in use, and giving entire satisfaction.

Sizes—2, 3, 5, 8, and 10-horse power.

THE MOST ECONOMICAL ENGINE IN THE WORLD.

Call and see them or send for Circular and Price List to

WILLIAM D. RUSSELL,
Office of The Baxter Steam Engine Co.,
18 Park Place, New York.

Jan16:1y

COOPER'S GLUE AND REFINED GELATINE

COOPER HEWITT, & CO.,

NO. 17 BURLING SLIP, NEW YORK.

Bar Iron, Braziers' Rods, Wire Rods, Rivet and Machinery Iron, Iron and Steel Wire of all Kinds, Copperas.

&c., &c.

RAILROAD IRON, COOPER WROUGHT IRON BEAMS AND GIRDERS,

Martin Cast-Steel, Gun-Barrel and Component Iron,

PUDDLED AND REFINED CHARCOAL BLOOMS,

Ringwood Anthracite and Charcoal Pig Iron.

Works at Trenton and Ringwood, N. J.

May 17:1y

TUCK, FRENCH & GODDARD

SUCCESSORS TO

POST & GODDARD and J. A. FRENCH & CO.,

No. 111 Liberty St., New York.

AGENTS FOR THE

New York Tap and Die Co.,
Centre Brook Manufacturing Co.,
New Jersey Rubber Co.,
Goddard Solid Emery Wheel,
Manufacturers' Leather Belting Co.,
and General Agents for Burch's HELICAL HAND DRILL.

We have largely increased our facilities for promptly accommodating our customers. All orders promptly filled.

Address P. O. Box 3362. June11:1y

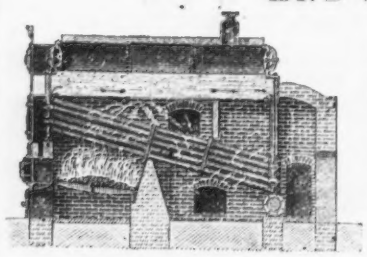
COAL. THE BEST VARIETIES IN LEHIGH AND WILKESBARRE Shipments made to all points accessible from New York.

LAWRENCE TOWER,
June 11:3mo 71 Broadway, New York.

BABCOCK & WILCOX'S

TUBULOUS SAFETY BOILERS

AND STEAM ENGINES.



REFERENCES:

Decastro & Donner Sugar Refining Co., N. Y.....12 Boilers, 900 H. P.
Havemeyers & Elder, Sugar Refiners, N. Y.....8 Boilers, 600 H. P.
F. O. Matthiessen & Weichler's Sugar Refining Co., N. Y.....4 B'rs, 300 H. P.
H. C. Havemeyer & Co., Sugar Refiners, New York.....3 B'rs, 225 H. P.
Singer Sewing Machine Company, New York.....10 B'rs, 734 H. P.
Jessup & Moore, Paper M'f'rs, Wilmington, Del...Engines & 4 B'rs, 200 H. P.
Harlan & Hollingsworth Co., Iron Ship Builders, Wilm'n, Del.2 B'rs, 200 H. P.
Harrison, Havemeyer & Co., Sugar Refiners, Phila., Pa.....8 B'rs, 600 H. P.
Pennsylvania Railroad Co., Philadelphia, Pa.....Engines and Boilers.
David Trainor & Sons, Cotton Mills Linwood, Pa...Engine & 4 B'rs, 200 H. P.
Druid Mills, Gambril & Co., Baltimore, Md.....Engines &2 B'rs, 150 H. P.
Calvert Sugar Refining Co., Baltimore, Md.....22 B'rs, 1100 H. P.
Woods, Wecks & Co., Baltimore Sugar Refinery, Balt., Md.10 B'rs, 750 H. P.
And many other sets of Boilers and Engines from 5 Horse Power upwards.

This Boiler has steam and water drums of ample capacity, lap-welded boiler tubes, iron to iron ground joints, tested at 500 pounds, supplies **Dry Steam**, with steady pressure and water line. Also Steam Engines, vertical and horizontal, plain valves, or automatic cut off. Correspondence solicited.

BABCOCK & WILCOX, 30 Cortlandt street, New York.

BACON'S

HOISTING ENGINES

FOR MINES, BLAST FURNACES, PILE DRIVING, CONTRACTORS' USE, &C.

COMPACT, STRONG, SIMPLE AND DURABLE.

Manufactured by

THE MORRIS COUNTY MACHINE & IRON CO.,

OFFICE AND WAREROOM.....36 CORTLAND STREET, N. Y.
WORKS.....DOVER, N. J. jan9-tf

OTIS' SAFETY HOISTING MACHINERY.

Special adaptation for **MINES and FURNACES.**

Just Out—combining RAPIDITY of MOVEMENT, EASE of CONTROL and PERFECT SAFETY with GREATEST DURABILITY.

WORN PARTS CAN BE REPLACED IN A FEW MINUTES.

OTIS BROTHERS & CO.,....PATENTEES AND SOLE MANUFACTURERS.

OFFICE 348 BROADWAY, NEW YORK.....FACTORY AT YONKERS.

May 21:1 yr

BURLEIGH

ROCK DRILLS

AND

AIR COMPRESSORS.

The Burleigh Rock Drills, which have stood the test of five years constant use at the Hoosac Tunnel, and which are now in use in nearly every State in the Union, as well as in Europe and South America, are unequalled in efficiency and economy by any other Drilling Machine. They are of various sizes, and equally well adapted to Tunnelling, Shafting, Open Cut or Quarrying, and will drill six to ten inches per minute in granite. They are driven by steam above ground, or compressed air when under ground. The Burleigh Air Compressor is the best engine yet devised for furnishing the "air motor" for the many purposes to which it is now being applied.

Send for illustrated pamphlet to

BURLEIGH ROCK DRILL CO.,
FITCHBURG, MASS.

LAFLIN & RAND,

POWDER CO., 21 Park Row, opposite Astor House, New York,

invite attention to their facilities for delivering

BLASTING POWDER,
SAFETY FUSE,
ELECTRICAL BLASTING
APPARATUS, &c.,

wherever required, from having nine manufactories in different States, beside agencies and magazines at all distributing points. nov. 1:1y

---

PROPELLER PUMPS

of any capacity and elevation, without valves. For clean water, sand, saw dust, etc. W. B. BUCK, Sec., 67 N. Front street, Phila.

Diamond-Pointed STEAM DRILLS.

Recent improvements in connection with the celebrated LESCHOT'S patents, have increased the adaptability of these drills to every variety of ROCK DRILLING. Their use, both in this country and in Europe, has sufficiently established their reputation for efficiency and economy, over any other now before the public.

The Drills are built of various sizes and patterns, WITH and WITHOUT BOILERS, and bore at a uniform rate of THREE TO FIVE INCHES PER MINUTE in hard rock.

They are adapted to CHANNELLING, GADDING, SHAFTING TUNNELLING and open cut work; also to DEEP BORING for TESTING the VALUE of MINES and QUARRIES. TEST ORES taken out, show the character of mines at any depth. Used either with steam or compressed air. Simple and durable in construction and never need sharpening.

Manufactured by

THE AMERICAN DIAMOND DRILL CO.,
No. 61 Liberty Street,
march19 6m New York.

RAILROAD IRON FOR MINES.

Stock Constantly on Hand of any weight and pattern, and sold in lots to suit purchasers. Also Chairs, Spikes and Fish Joints for same.

FOR SALE BY
DANA & COMPANY
(P. O. Box 5459)
18 WILLIAM STREET,
NEW YORK.

Light Locomotives for use in Collieries, Mines, etc.
march 5 1y